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Cost Reduction Journal

Published by the Directorate for Cost Reduction Policy, Office of the Assistant Secretary of Defense (Installations and Logistics).

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The Cost Reduction Journal is published quarterly by the Directorate for Cost Reduction Policy, Office of the Assistant Secretary of Defense (Installations and Logistics), for distribution within the Department of Defense.

The Cost Reduction Journal seeks to stimulate cost reduction ideas, promote cost consciousness, and enhance understanding of efficiency programs. The Journal's content includes: (1) cost reduction goals and accomplishments; (2) policies and procedures of the cost reduction system; (3) cost reduction techniques and processes in all functional areas from which savings are derived; (4) new developments in concepts and philosophy that affect cost reduction objectives; and (5) specific cost reduction examples, with attribution where appropriate.

“I Am Proud of What You Have Done.”

The following statement was received from the White House for publication in the Department of Defense Cost Reduction Journal.

THE WHITE HOUSE

WASHINGTON

June 6, 1966

The material progress that the men and women of the Defense Department have made in reducing costs has provided resources to enhance our national security, to meet urgent needs at home, and to assist underdeveloped nations abroad. You have provided striking evidence that finding ways to accomplish specific objectives at less cost helps us all to achieve our national objectives.

I am proud of what you have done. But the demands on the Government are ever growing and therefore still further imaginative and innovative approaches to cost reduction are needed.

I ask that cost consciousness be made a part of the personal creed of every employee as a positive means of fulfilling the obligations of this Government.

Editorials

FORMULA FOR FOLLOW-THROUGH

In the cost reduction business, it takes three to tango: crossfeeder, appraiser, and transplanter. That is precisely the tune being played down San Antonio Way (Texas, that is) by Headquarters, U.S. Air Force Security Service.

An unclassified version of that organization's Staff Digest now makes its appointed rounds with capsule summaries of savings ideas that have already found a home somewhere in the organization. That is the *crossfeed.*

A crossfeed council meets monthly to match new ideas with potential users. The organizational units with functions to which the idea could be applied receive the complete details—accompanied by a "why not." That is the *appraisal.*

Followup interest is centered where it counts—in the members of the crossfeed council who also wear hats as headquarters staffers for the various functions within the Security Service. That is the stimulus for the actual implementation of the idea—the *transplant.*

We are impressed. ☐

DISTRACTION

We experienced mixed emotions when eyes were temporarily diverted from our Contractor Cost Reduction Exhibit at the Sheraton Park Hotel in Washington, D.C., on April 28. However, we were more than willing to yield the spotlight to our adversary attention-getter—U.S. Savings Bonds. Either way, cost reduction or savings bonds, Uncle Sam was bound to gain.

The photo? Oh, yes. Dianna Lynn Batts, Miss U.S.A., swept through the cost reduction exhibit en route to the podium where the photo shows her boosting bond sales. ☐

SYSTEMATIC TRANSPLANT

The crossfeed council of Headquarters, U.S. Air Force Security Service massages small-saving ideas for repeat performances that could blossom into big-savings accomplishments.

The Security Service is commanded by Maj. Gen. Louis E. Coira, USAF (photo at left). Chairing the group (center) is Col. Harold E. Reichenberg. At his left are M. Sgt. Loe. R. Hanes, Capt. Lawrence E. Murray, Mr. Frederick E. Byargeon, Mr. Eugene A. Parker, Jr., and 1st Lt. Bruce F. Thyfault. At the chairman's right are: Mr. Howard N. Scales, Jr., Mr. Joseph C. Nicols, Mrs. Angela M. Scheibe, Capt. Winters G. H. Alderman, and Maj. William H. Parker.

SYSTEMS ANALYSIS

By **Dr. ALAIN C. ENTHOVEN**

Assistant Secretary of Defense for Systems Analysis

The Approach

Systems analysis is nothing more than quantitative or enlightened common sense aided by modern analytical methods. What we seek to do in the systems analysis approach to problems is to examine an objective in its broadest sense, including its reasonableness or appropriateness from a national policy point of view, and then develop for the responsible decisionmaker information that will best help him to select the preferred way of achieving it. This process of selection requires that we first identify alternative ways of achieving the objective and then estimate, in quantitative terms, the benefits (effectiveness) to be derived from, and the costs of, each alternative. Those aspects of the problem that cannot easily be quantified are explicitly stated. In principle, we strive to identify the alternative that yields a specified degree of effectiveness for the least cost or, what is the same thing, the greatest effectiveness for a given cost. In essence, it is a way of dealing with the basic economic problem—how best to use our limited national resources.

Application of the Scientific Method

What are the relevant characteristics of scientific method as applied to the problem of choosing strategies and selecting weapon systems, or, for that matter, to the analysis of any problem of public policy involving allocation of the nation's scarce resources?

First, the method of science is an open, explicit, verifiable, self-correcting process. It combines logic and empirical evidence. The method and tradition of science require that scientific results be openly arrived at in such a way that any other scientist can retrace the same steps and get the same result. Applying this to weapon systems and to strategy would require that scientific results be openly arrived at in such a way that any other scientist can retrace the same steps and get the same result. Applying this to weapon systems and to strategy would require that all calculations, assumptions, empirical data, and judgments be described in the analysis in such a way that they can be subjected to checking, testing, criticism, debate, discussion, and possible refutation. Of course, neither science nor systems analysis is infallible. But infallibility is not being claimed; it would be worse than unscientific to do so. However, scientific method does have a self-correcting character that helps to guard science from persistence in error in the long run.

Second, scientific method is objective. Although personalities doubtless play an important part in the life of the physics profession, the science itself does not depend upon personalities or vested interest. The truth of a scientific proposition is established by logical and empirical methods common to the profession as a whole. The young and inexperienced scientist can challenge the results of an older and more experienced one, or an obscure scientist can challenge the findings of a Nobel Prize winner, and the profession will evaluate the results on the basis of methods quite independent of the authority of the contenders, and will establish what is the correct conclusion. In other words, the result is established on the objective quality of the physics and not on the reputations of the persons involved.

Third, in scientific method in the broadest sense, each hypothesis is tested and verified by methods appropriate to the hypothesis in question. Some are tested and verified logically, some experimentally, some historically, etc. Some sciences, of course, can reproduce experiments cheaply and they tend to emphasize experiment. This is notably the case with the physical sciences. In others, particularly some branches of medicine and the social sciences, one cannot experiment readily, if at all, and the detailed analysis of available historical data is most appropriate. In this respect, they resemble military science very closely. In choosing weapon systems some experimentation is possible but a great deal of analysis is also required. In fact, in the development of weapon system analysis, one is more handicapped than in most of the sciences, for fully realistic tests come only at infrequent intervals in war, while the development of new weapon systems also takes place in peacetime. But this argues for better analysis and more heavy reliance on analysis where fully relevant experience is not generally available.

Fourth, quantitative aspects are treated quantitatively. This is not to say that all matters can be reduced to numbers, or even that most can be, or that the most important aspects can be. It is merely to say that the appropriate method for dealing with some aspects of problems of choice of weapon systems and strategies requires numbers. Nonquantitative judgment is simply not enough. What is at issue here really is not numbers or computers versus words or judgment. The real issue is one of clarity of understanding and expression.

Numbers are a part of our language. Where a quantitative matter is being discussed, the greatest clarity of thought is achieved by using numbers instead of by avoiding them, even when *uncertainties* are present. This is not to rule out judgment and insight. Rather, it is to say, that judgments and insights need, like everything else, to be expressed with clarity if they are to be useful.

Let me emphasize the point about uncertainties. Many people seem to feel that quantitative analysis is not possible if there are any uncertainties. But this view is incorrect. In fact there is substantial literature on the logic of decisionmaking under uncertainty going back at least as far as Pascal, Bernoulli, and Bayes in the 17th and 18th centuries. Moreover, there are simple practical techniques for dealing with uncertainty which make it possible to do analyses that point up the uncertainties for the decisionmaker and indicate their significance. In fact, rather than conceal uncertainties. a good analysis will bring them out and clarify them. If it is a question of uncertainties about quantitative matters such as operational factors, it is generally useful to examine the available evidence and determine the bounds of the uncertainty. In many of our analyses for the Secretary of Defense, we carry three estimates through the calculations: an "optimistic," a "pessimistic," and a "best" or single most likely estimate. If there are uncertainties about context, at least one can run the calculations on the basis of several alternative assumptions so that the decisionmaker can see how the outcome varies with the assumptions.

The Limitations of Systems Analysis

What's wrong with systems analysis? What are its particular limitations and biases? One criticism I have heard is that emphasis on quantitative analysis risks ignoring those factors that cannot be reduced to numbers, or at least overemphasizing those that can.

Suppose, for example, that the problem is to choose between two alternative ways of destroying a certain set of targets. The less costly way is to base short-range missiles on the territory of an ally; the more costly way is to cover the targets with long-range missiles based in the United States. But suppose basing the missiles on the ally's territory would lead to political difficulties; to the embarrassment and possible fall of a friendly government. How does one take account of such political aspects in a quantitative analysis? The answer is that one doesn't. There is no way of "grinding in" the potential political difficulties of an ally. The most the analysis can do is make clear to the decisionmaker the differences in cost and effectiveness between the two approaches so that he can make an informed judgment about their weight in relation to the political problems.

I would not want to deny that there is potential danger here, even though there is nothing about the systems analysis approach that prevents an assessment of the political or other non-quantitative factors from being included in the staff work. I am confident that the top-level leaders of the Department of Defense who use systems analyses as one of their sources of information are careful to give balanced consideration to all factors, whether quantitative or not.

Another criticism sometimes made is that application of the "flat of the curve" argument to force or performance requirements may lead people to ignore the decisiveness of a narrow edge in superior performance. There is a danger here if an unwary analyst confuses *performance* and *effectiveness.*

There is no question but that, in some cases, a narrow edge in performance may have a very great impact on effectiveness. The performance advantage of the Japanese Zero fighter over American aircraft at the beginning of World War II is a good case in point. But there are other cases in which even a substantial increase in performance, purchased at a high price, may have a small impact on effectiveness. For example, many

Navy aviators believe that under today's conditions, a substantial speed advantage in attack aircraft may mean rather little in terms of increased effectiveness. But this mistake is clearly not peculiar to the systems analysis approach. The only way to avoid it, and to relate performance to effectiveness properly, is with the help of good analysis.

Next, it is argued that the system analysis approach may be biased against the new and in favor of the old. I am sometimes concerned that our analyses may be subject to such bias, but I think that the method of open explicit analysis is much less likely to be so biased than is reliance on judgment or intuition or experience unsupported by analysis. The reason for the bias is that we all tend to compare the old and the new in the current mission that happens to have been optimized for the old.

Finally, sometimes it is said that systems analyses oversimplify complex problems. Of course, we have to simplify the complex problems we face; no one could possibly understand most problems of modern weapon systems and strategy in all their complexity. And it is a natural human failing to oversimplify. But I believe the facts are that the systems analysis approach is much less prone to oversimplification than any alternative approach. For it is part of systems analysis to bring to bear all of the best of modern analytical techniques for organizing data and summarizing clearly its most relevant aspects. Moreover, reliance on the method of open, explicit analysis is our best guarantee against persistence in harmful oversimplification. For if I must lay out clearly all of my assumptions, objectives, factors, and calculations, my critics can see what I have done and point out where I have oversimplified, if indeed I have done so. But if I am allowed to keep it all in my head and appeal to experience or judgment, others have no way of knowing whether or not I have oversimplified the problem.

Introduction of Systems Analysis in the Defense Department

Although systems analysis is a reasonable and straightforward concept, it was not an easy one to implement in the Department of Defense. In conducting a sound cost/effectiveness study you must be able to associate both the benefits and costs with the alternatives to be examined. The Defense management system as it existed five years ago did not permit this Assistant Secretary Hitch described the problems he encountered as follows:

"In 1961, the chief, in fact the Secretary's only, systematic and comprehensive vehicle for the allocation of resources in the Defense Department was the annual budget. For the task which it was being asked to perform, it was deficient in several respects. The budget focused on the financial problems of a single upcoming fiscal year, thereby discouraging adequate consideration of decisions whose near term dollar impact was slight but whose impact in later years was very large, to the point of becoming an important constraint on Defense managers. The structure of the budget, which portrays the Defense program in terms of broad functional purposes (e.g., personnel, procurement and construction) and organizational components also limited its usefulness as a management tool. Rational military strategies and force requirements have to be planned and expressed in terms of the final products of the military program, such as numbers of combat ready divisions and deployed missiles, rather than in terms of the basic resource ingredients of the budget. Moreover, in the Department of Defense at that time there was an almost complete dichotomy between military planning, which was long range, expressed in terms of outputs, and performed by military planners in the Joint Staff and the Military Departments; and budgeting which was shortrange, expressed in terms of inputs, and performed by the Comptroller organization."

"It was to bridge the gap between these two functions that we designed and installed the programing system. By linking military planning and budgeting in a unified planning-programing-budgeting decision-making process we are able to produce a single Departmentwide blueprint for the future known as the five year force structure and financial program. The program projects not only the military forces needed to meet the requirements of our long-range military plans but also the personnel, equipment, supplies and installations required to support them. In addition, the program projects the full costs of these resources, thereby permitting responsible decisionmakers to assure themselves that the program they are planning is financially feasible and is providing a sound basis for the development of our annual budget request to Congress."

The programing system thus allows the reader to see at a glance how much of the Department of Defense budget is going to strategic retaliatory forces and how much of that is going to each of the major weapon systems included in that category. This is clearly a far more meaningful way of subdividing the Defense budget from the point of view of determining its overall shape. But even more importantly, the programing system permits us to relate both benefits and costs to the forces and activities that must be compared and planned. This feature is essential to any agency that hopes to apply the systems analysis approach to its problems.

The Work of Systems Analysis

The primary function of systems analysis in the Pentagon is to assist the Secretary of Defense by developing information that will be useful to him in making key decisions on force levels and resource requirements. For this reason the work of the staff is tied very closely to the annual Defense decision-making cycle which is based on detailed continuing requirements studies. Carefully formulated, detailed analytical studies are basic to sound decisions on force and resource requirements. We develop each year a program of studies that we believe should be conducted during the coming year. These proposed studies are submitted to the Secretary who reviews them, decides which ones he feels are required, and requests the Joint Chiefs of Staff and the Service Secretaries to have their staffs conduct them. My staff works closely with the groups that are actually conducting the studies to advise them on methodology, selecting assumptions, and to insure that the study is focused on the questions the Secretary feels need answering. When the studies are completed and submitted to the Secretary we assist him by reviewing them, indicating weaknesses, summarizing them for his use, etc.

The completed studies normally serve as the basis for proposed changes to the five year defense program. These changes may be submitted by one of the military deparments or by the Joint Chiefs of Staff. Proposed changes to the force structure are then reviewed in depth by the staff of the Office of the Secretary of Defense. We in systems analysis emphasize "cost-effectiveness" studies of the proposals, comparing each with the previously approved force and other alternative ways to accomplish the mission. The Secretary then makes tentative decisions on the force structure. These tentative decisions are reviewed by the Joint Chiefs of Staff and the Military Departments, who have the opportunity to make further recommendations. After further discussions with his principal military and civilian advisors, the Secretary of Defense makes his final decisions, and these decisions serve as the basis for the annual budget. The budget is reviewed by the Secretary in the fall of each year and, of course, submitted to Congress in January. By this point we are well into the next cycle and new requirements studies are being initiated.

Throughout the decision-making cycle, systems analysis emphasizes integration of the various elements of the Defense program and focuses on the broad national security objectives. This should be a primary objective of any system analysis staff at the Federal, State, or local governmental level, as it is an area in which most Government organizations are weak. This was particularly true in Defense five years ago.

A 1961 organizational chart of the Department of Defense would show the advisors to the Secretary of Defense on forces and military strategy, the Joint Chiefs of Staff; the advisor on research and engineering matters, the Director of Research and Engineering; the advisor on financial matters, the Comptroller; the advisor on production matters, the Assistant Secretary for Supply and Logistics; the advisor on international matters, the Assistant Secretary for International Security Affairs; etc. Each advisor was concerned primarily with his own specialty rather than the Defense program in its entirety. The Secretary of Defense, virtually alone, was expected to integrate all of these diverse facets personally and to do so without systematic assistance.

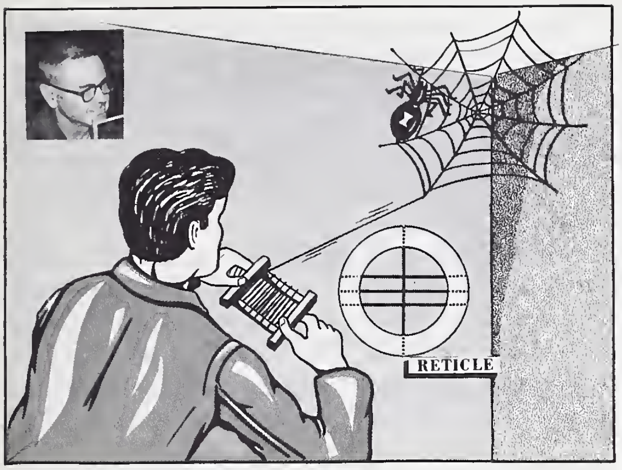
The programing system was developed to provide one mechanism for integrating the diverse parts of the Defense program, especially to integrate force planning with budgeting and support programs. The Systems Analysis Office was established to gather and display information associated with these different areas in a manner that would show the Secretary of Defense how the pieces fit together. Its work cuts across these various specialties. Of course, the information that we provide the Secretary of Defense is only one of many inputs available to him, and the integrating functions that we perform in no way reduce the very great importance the Secretary attaches to the advice and information provided by the Joint Chiefs of Staff and his other civilian advisors.

Some Important Preconditions for Success

Two conditions seem to me to be necessary to the successful development and functioning of a systems analysis group within a policy-making organization. The first is that the responsible decisionmakers make use of systems analysis and take it seriously. Without this, the professional personnel will recognize in time that their work is not influencing the course of events and their motivation is likely to be destroyed. By using systems analysis and taking it seriously, I do not mean that the decisionmakers must accept the results of the analyses uncritically or that they must rely exclusively on the systems analysis input. Far from it. Every analysis must be based on many as-

(Continued on page 19)

NO MISS MUFFET



Shades of Robert Bruce! He drew only inspiration from the spider. At Fort Belvoir there is a sergeant who filches the whole web—netting $4,150 a year for the Government.

Dumpy levels, alidades and transits are surveying instruments. Now and then they get out of whack. Repairs often call for replacing the crosslines (reticle) in the viewpiece.

Enter the black widow spider. Crosslines are made from its web, which is a single strand about five times the strength of steel for the same diameter. (Other kinds of spiders turn out weaker webs, or double or twisted webs, or webs that are patched or tacked.) Most instrument repair shops buy the web—at $25 per rack (12–14 feet). Not so, SSgt. Richard D. Johnston, a military instructor in the Topographic Instrument Repair Course at Fort Belvoir, Virginia. He beards the spider in its den (woodpiles, old tin cans, etc.), removes it to the classroom, and sets up the production line.

A single active producer can supply up to 200 feet of line. Since the life of a good producer hangs by a thread in cold weather, three are kept in harness all summer to compensate for production falloff in the winter. Student consumption totals about 166 racks per year. In addition to lowering costs, inhouse production also improved quality since commercial web was often brittle from an overlong shelflife.

The sergeant received a $70 incentive award for his action—buttressing the Journal's thought that this was a pretty good yarn to spin. (Photo page 43) ☐

HOW MUCH DID YOU SAVE TODAY?

STITCHING NINE SAVES TIME

Hemming T-shirts with 9 or 10 stitches to the inch as is done commercially—instead of with the additional number called for by government specification—enables 8 machines to produce as many shirts as 9 machines did previously.

This timesaver (thread, too) grew out of a homespun idea generated by James D. Greene, an industrial specialist in the Production Directorate of Atlanta's Defense Contract Administration Services Region. The idea was prompted by a bottleneck that had developed in the manufacture of undershirts for urgent military requirements.

Using commercial T-shirts bought at his own expense, a washing machine operated by his wife, and know-how gained at a recent value engineering seminar, Mr. Greene found that the lesser-stitched hems withstood washday pounding as well as the extra-stitched hems required by government specification.

His findings were accepted by the Government. As a result, an average increase of 800 units per 8 hemming machines per 8-hour day will help break the production bottleneck. Annual savings are expected to run $79,800.

Colonel Loren P. Murray, USAF, Director of DCASR, Atlanta, presents Mr. James D. Greene, industrial specialist, with a certificate and a check for $1,050 for his cost-saving suggestion on the manufacture of GI undershirts.

Tent pins for use in arctic and other hard soil regions are now made from a lower priced grade of steel. The switch in grades saved DSA's Defense Personnel Support Center, Philadelphia, Pa., $24,038 on a recent purchase of 141,400 pins.

PINS DOWN SUBSTITUTE, CLEAVES COSTS

For the uninitiated, a clevis pin is part of the assembly by which a parachute is fastened to the BDU–8B practice bomb to control descent. A poor cost versus function ratio prompted three Air Force employees to ask for a value engineering study. The study results showed that a standard nut and bolt assembly not only was less expensive but also improved the strength and reliability of the clevis. Cost of the clevis pin had been $2.02. There are eight clevis pins per bomb. Cost of the substituted bolt, nut, and washer is $0.2176. Fiscal year 1966 savings on 46,163 pins added up to $83,177 after deducting a $27 offsetting cost.

The men who sparked the search for a substitute were J. L. Tubbs and D. L. Teet of San Antonio Air Materiel Area, and N. Yesconis of Wright-Patterson Air Force Base, Dayton, Ohio. ☐

EXCESS TANKS SHAPE UP

An 8.5-gallon oil tank can hold 14.5 gallons—but only if reconfigured to the higher capacity. This was precisely what was done when a mission requirement for the T–28 aircraft called for the 6-gallon increase.

Rather than buy the larger tanks, Mrs. Jesse L. Stanley and Mr. Joe J. Tadlock of McClellan Air Force Base pressed the value engineers to explore the reconfiguration alternative.

Result: 80 excess 8.5-gallon tanks were programed for modification in fiscal year 1966. A new tank would have cost $1,343. Modification of an excess tank costs $302. Net savings in fiscal year 1966 aggregated $83,280. ☐

NO BEDTIME STORY

Once upon a time, mattresses that had served 8 years in Government family housing at Tyndall Air Force Base were relegated to wherever old mattresses go when they are retired. Excessively worn and torn mattresses traveled the same route even though not 8 years old. New replacements cost from $24.60 to $45.00, depending on size and type.

However, times and practices have changed. Each deteriorated mattress at Tyndall AFB now is restored to "like-new" condition for 17 to 40 percent less than the cost of a new one. The restoration is handled by the Georgia Factory for the Blind whose work, according to Tyndall AFB officials, is "outstanding." ☐

INFLATABLE RAFTS, DEFLATABLE COSTS

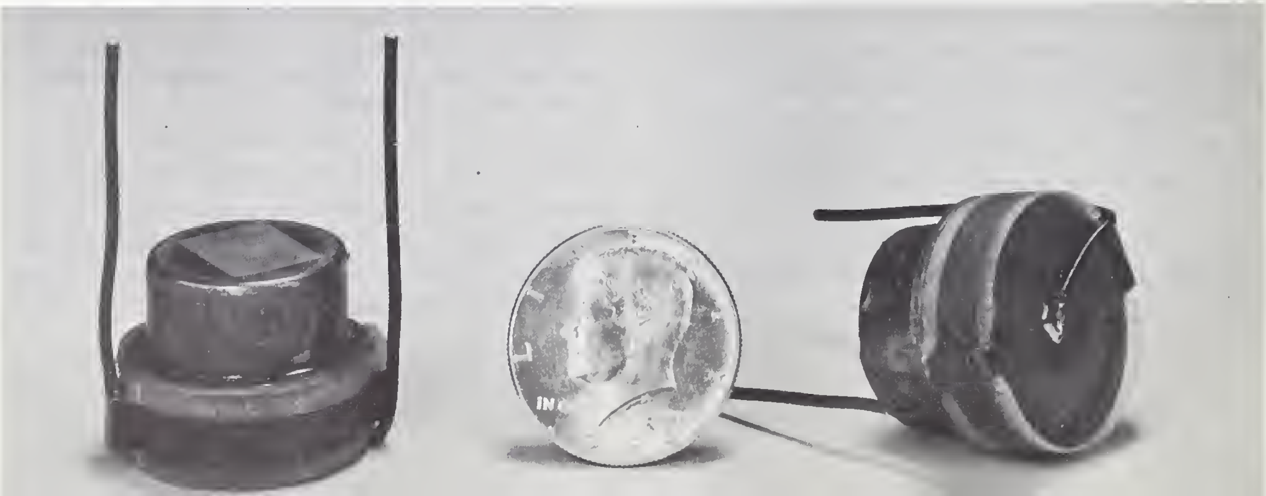
Routine disposal of 8-year-old life rafts ceased when a value engineering analysis disclosed that tighter quality assurance specifications and use of nylon in lieu of treated cotton fabric extended safe life indefinitely.

Cost of new rafts to replace those over age would have been $4,733,177. Computing the normal 20-percent attrition loss against this figure, net savings aggregate $3,786,542.

Sponsor of the analysis that led to the change in Navy disposal policy for life rafts was Anthony J. Gambale, a supervisory inventory management specialist with the Aviation Supply Office in Philadelphia. Gambale has received five beneficial suggestion awards since 1958. He was recently recommended for two additional awards. ☐

HALF DOLLAR SIZE, MULTIDOLLAR RETURN

The half dollar denotes the size of an ingenious 35-volt, 400-watt, low-cost battery for proximity fuses developed by Army's Harry Diamond Laboratories. Cost will approximate 80 cents each in production quantities. The unit, still undergoing evaluation test, is expected to lower prices on millions of artillery shells.



MANAGING MANAGEMENT SYSTEMS

By **ROBERT W. MILLER**

Vice President, United Research, Inc.

This article was submitted at the request of the Journal in May 1966. Its appearance in this publication should not be construed as Department of Defense endorsement of the views expressed.

Proliferation of Management Systems

The last half-dozen years have seen a remarkable upsurge in the development of managment systems for R&D based programs sponsored by the Government. While the majority of this development has taken place in the Department of Defense (DoD), the National Aeronautics and Space Administration (NASA) and other Government agencies with large R&D-oriented programs have contributed to the picture. However, because most of the problems which have arisen in this area as of 1966 result from developments within DoD, the focus of this article is on the Department of Defense.

Systems Growth Essential

First of all, it is important to note that this rapid development of management systems—it would not be unreasonable to call it a revolution—was a matter of vital necessity. Without getting into an extended discussion of prior developments, it is fair to say that the conventional management systems used by large commercial organizations (i.e., the standard "industrial-engineering-plus-accounting" controls used by the majority of production-oriented companies) are simply inadequate to the task of modern program management. Nevertheless, while the "Detroit-style" management controls pioneered by Alfred Sloan and Donaldson Brown of General Motors during the period 1921–25 are not relevant to the DoD problem, the *manner* in which these remarkable gentlemen "managed the development of management systems" for the world's largest commercial organization is very relevant indeed.

Program Package System

During the period 1961–65, the Department of Defense had one of the same problems Alfred Sloan and Donaldson Brown faced forty years earlier, namely, the necessity of bringing together diverse and conflicting organizations into a unified whole. In the management systems area, the basic approach used by DoD was the Program Package System. It is not the purpose of this article to discuss the Program Package System in detail, but only to point out that it has been the result of a very major effort indeed and has received the personal attention and full backing of the *top management* of the Department of Defense. Even today, as of 1966, there are still problems associated with the Program Package System, including its cumbersome change mechanism. Without going into any discussion of these, the point should again be made that a great deal of effort is currently being devoted to these problems, with full visibility and attention at the top of the Department of Defense.

Program Management

Now, what about those management systems developed for the *detailed planning and execution of approved programs* during this same period; i.e., 1961–65? These will be referred to as "program management systems" to distinguish them from other internal

DoD management systems, the large body of Armed Services Procurement Regulation requirements, etc. It should be clear that these are the management systems typically laid upon industry in connection with accomplishing the missions and specific project goals of the military departments. It is in this area that the analogy with the General Motors situation stops, largely because of the greater magnitude and complexity (including the industrial interface) of the DoD problem.

Nevertheless, the point should immediately be made that, if a uniform approach to the entire spectrum of program management systems were to be undertaken by DoD, the magnitude of effort and skills required would be greater than that used in implementing the Program Package System—great as that was and is. The reason for this is twofold, namely: (1) the large accumulation of individual program management systems which has built up during the period 1961–65 (and is continuing to build up today) and, (2) the fact that the complexity of the entire defense industry base is *directly* involved—which it is certainly not in the case of the Program Package System.

Evidence of Problem Magnitude

What evidence is there that the program management system problem in DoD is one of the magnitude indicated? Facts and figures in this area are rather difficult to come by, but let us approach the problem from several different angles.

In a speech given on March 3 of this year in Boston, Assistant Secretary of Defense Robert Anthony stated the following:

"One survey I looked at recently found 58 or more different (or at least differently named) systems in use where there was an interface of DoD Project Managers and weapons system contractors. That's too many."

Suffice it to say, I agree completely with Secretary Anthony, and would only add from my own personal knowledge of the subject that many of these systems are "outdated," and could be immediately purged from DoD requirements—something that has not generally been done, by the way—if the clear authority to do so were there. In addition, Secretary Anthony's reference to the fact that a particular requirement may be only "differently named" brings up one of the "hairiest" problems in the program management systems area. This problem is that differences in *detailed requirements* have an important impact, and add significant incremental costs, at the contractor level. In the case of Configuration Management, for example, I can think of two Services which have approaches that are "compatible in principle," but where certain detailed requirements differ significantly.

Contractor Preparation Increased

Pending the possible resolution of this kind of problem at OSD level (an activity which, in the case of Configuration Management, has been going on for some time in DDR&E), contractors who do business with both of these Services clearly have to examine the full set of requirements, and be prepared to implement both. In connection with this same problem, one industry spokesman recently stated that with the rapid development of program management requirements—particularly over the past 2 years—it has become almost necessary to confine his defense business to one Service, or even an agency of one Service, if program control costs are not to become excessive.

The Air Force, led by the Air Force Systems Command, has recently attempted to attack the problem of contractor-required data by means of the authorized data list (ADL) mechanism. The AFSCM 310–1 development has been a very important effort in this connection. However, of the total of 290 data items called out in the most recent AFSCM 310–1 Manual one hundred and seventeen (or approximately 40%) can be counted as being *program management requirements*, as opposed to *deliverable technical data* requirements. (A major trade association has independently arrived at a 50% figure.) When you stop to think that a given data item called out in AFSCM 310–1 typically references, in the Form 9, other lengthy guides and manuals, and that half of these data items relate to program management requirements, you begin to get a feel for the magnitude of the problem—if you did not already possess it.

Library Essential

One of the leading companies in the aerospace industry—one that does business with all the Services and NASA, and is generally recognized as a leader in the program management field—has recently established what amounts to a "library" of these program management requirements. This has been done (and wisely, I think) so that this particular organization can be right up-to-date in responding to all requests for proposals. As of today, this library consists of directives, guides, handbooks, pamphlets, and manuals in the program management area exceeding 20,000 pages. If this figure surprises you, remember that OSD itself, the three Services, and NASA are all contributors to this library. Incidentally, this particular organization, which has as strong a program management approach as any I know, requires something less than 3,000 pages to document its own internal program management systems. I hope you can now see the mountain we are talking about more clearly, and I think you will agree that it is as high or higher than any in the DoD chain—even Mount ASPR.

Program Control Expensive

What about the cost of implementing these program management requirements, in both industry and government? This is a subject on which it is hard to get a good handle, particularly when you remember that we are *not* talking about the cost of producing just the required documentation itself. Behind the execution of a given CIR, CIS, PERT/cost, system engineering, configuration management, or logistical planning document, there must be a good deal of internal organization effort and capability skilled in the particulars of a given program management requirement. Although the costs of some of this effort, including program planning and control personnel, computer costs, etc.—can clearly be isolated (and even costed incrementally as a contract item), the majority of these costs cannot be identified through established accounting systems, and are not to be found in total in Cost Analysis breakdowns. Similarly, the costs of carrying out these requirements within the Government itself are not easily identifiable. Anybody with actual experience in the implementation of these management requirements, however, knows the costs are there, even if they cannot be clearly seen. The impact is particularly great in the engineering area, on an "across-the-board" basis—and in Manufacturing production and quality control. I would estimate the impact in these areas is easily 2 to 3 times the cost of the production of the documented data itself.

Ten Percent Cost Increase?

Because this is a particularly difficult subject (and one that is not likely to be fully resolved), it might be appropriate to quote another source. In a talk entitled "The Impact of Government Program Control" given to the Armed Forces Management Association on September 1, 1965, Mr. J. Lynn Helms, Vice President of the Bendix Systems Division, stated: "The requirement for full PERT may introduce costs of from 2 to 6 percent of the contract value; PERT/cost may require 5 to 12 percent; and, leapfrogging ahead, the requirement for full documentation, manuals, reporting, accounting, provisioning; system support, etc., may require from 30 to 50 percent of the development contract value."

It is my view that Mr. Helms' figures are too high; but I would grant that the total effort he is talking about may amount to 20–25 percent of a major engineering or operational systems development contract, and that the costs of program management requirements within this total may amount to 10 percent, particularly if we remember we are talking about total organizational impact.

If you will accept the above estimates for talking purposes (or use your own if you like), then it is possible to discuss the total cost incurred, nationally, of DoD program management requirements. Clearly, the majority of these requirements are levied on programs in the categories of engineering and operational system development, as defined by DoD Directive 3200.6. A current fiscal year estimate of the total dollars programmed in these categories, for both RDT&E and direct follow-on production, is $10 billion, and this represents a conservative figure if anything. At a 10 percent level, then, the annual cost of implementing program management requirements for engineering and operational development programs is in the order of $1 billion.

There is another way, perhaps, of getting at a comparable figure. About a year ago, when efforts were being initiated at OSD level to get a handle on "the data problem," a figure of $2 billion was being bruited about as the estimated total annual cost to DoD of data acquisition. If you accept this figure, and if you agree that a figure of 50 percent of the Air Force's Authorized Data List is at least one strong indicator of the percentage of total data costs impacted by program management requirements, then you will arrive at a comparable figure in the neighborhood of $1 billion. Incidentally, the data people are wont to say that "20 percent of the data items account for 80 percent of the costs," and I want to assure you that this is equally true of program management systems. The requirements of 375–5 system engineering, configuration management, PERT/cost or CIS can easily amount to 80 percent of my 10 percent figure, or 8 percent of engineering development contract costs.

If a figure in the order of $1 billion or 10 percent surprises you, please remember again that these costs, in their total sense, are not covered by individual contract or work breakdown structure items, nor for that matter, can they be identified in even the more complicated cost analysis breakdowns. In addition, such a figure clearly does not represent incremental cost, since we have had cost and schedule controls, and some portions of the configuration management requirements, previously. In view of the magnitude and complexity of the Government requirements, however, I would estimate a very large percentage of these costs are, in fact, incremental—as much as 50 percent. It is not my purpose to argue the accuracy or inaccuracy of a particular figure today, but only to emphasize the general magnitude of the cost effect. In any case, I think you may now agree that the impact of these management requirements on total program costs is far greater than the impact of ASPR—notice I said impact on costs, not profits. In addition, I believe I could get my friends in OSD to agree that the "cost of implementation" of these program management requirements is far greater, in an absolute sense, than the cost of implementing the program package system—large an effort as the latter is.

How Much Is Enough?

The question then becomes: Is it all worth it? As of 1966, is the totality of DoD program management requirements cost-effective? Now, if you think that cost-effectiveness is a difficult subject in the hardware systems analysis area, I can assure you that it is much more difficult in the management systems area. In fact, any time an attempt is made to treat the subject of management requirements, or management itself, in terms of hard parameters such as cost or effectiveness, a great deal of obfuscation results—this is one of "the facts of life" of which we are all aware. It is also a fact that most of the management system requirements I have discussed have been approved for implementation with nothing like the look at costs given to hardware systems, plus the greatest confidence and belief in their efficacy or effectiveness.

Nevertheless, it is my own personal conclusion—based, I believe, on some background and experience in the field, that a very large percentage of these requirements *are in fact* necessary. Even though we have shifted from a cost-plus-fixed-fee to fixed-price-incentive contracting environment, it is simply impossible for the Government (or any large contractor, for that matter) to manage a major modern-day program without a comprehensive means of planning, baselining and interfacing technical, cost and schedule parameters, and having an adequate means of statusing these parameters against established plans and baselines.

Savings Potential

The trouble is that, while a large percentage of the program management requirements developed over the past six years are necessary, a large percentage of them are also not. It is my view that much more can be done to winnow down the 20,000 pages (or the $500 million to $1 billion effort) referred to earlier. And if you want to look at the problem from a cost reduction point of view, I would estimate that at least $100 million of total program management requirements represent duplicative effort at the level of industry. Here again one may argue with what is an admittedly difficult estimate—but my main purpose is again to indicate the magnitude of the problem.

In addition, note that I have been referring only to the *annual operating costs* of these requirements. The cost of *developing* the numerous management systems promulgated by various elements of the Department of Defense is also a very large one, and considered in total over the past years, is easily of comparable magnitude. Therefore, I think one would have to conclude that there are significant potential cost savings associated with this area—which, if they could be achieved—would be worthy of a place in Secretary McNamara's cost reduction program.

Inconsistency Between Systems

Is duplication of program management requirements—typically between the Services—the only source of difficulty? I fear not. Whenever you have a development of this magnitude and importance, you are bound to get inconsistencies between the systems themselves. The history of the DoD developments in this area is no exception. I am afraid that the main source of difficulty is the emphasis in DoD, including OSD, on functional organization specialization, and the resulting impact of this on program management requirements in particular. The problem is that, though everyone agrees the parameters of technical (including logistical), schedule and cost, are the fundamentals of any effective program management system, no one organization or authority in DoD really seems to be treating them as such. Even today, some observers who are close to the subject feel that two major elements of OSD are currently going off in different directions in several important program management requirements areas. The problem seems to result from functional orientation or specialization, and a lack of understanding of the integrated nature of the problem, which is probably related to the present OSD organization.

Industry Partially Responsible

Is Government—and in particular DoD—the only one that has contributed to the problems we are raising here today? Far from it. Industry—and in particu-

(*Continued on page 37*)

SHOCKED BUYER FINDS ALTERNATIVE

A nearly 300 percent jump in the price of resilient mounts (shock absorbers for delicate electronic items) so aroused Violet Taflan, a buyer at DSA's Defense Industrial Supply Center, that she collared Joseph Lauber of the Center's Directorate for Technical Operations, and together, they researched specifications for an alternate. They found one with a unit price of $1.17. The quoted price of the former supplier was $3.35 each. Savings on the initial procurement of the alternate mount totaled $5,384. ☐

Service or Civilian Personnel may earn cash awards for suggestions that effect improvements or economies in DoD components other than their own. Another method is suggesting improvement of material or services bought from contractors. Should a suggestion earn a cash award by adoption in the individual's own unit or service, and then be adopted by another service, the suggestor may also receive another cash award. Up to $25,000 may be awarded for inventions that benefit the U.S. Government. Service personnel and civilian employees may submit inventions to the local incentive awards committee for cash awards consideration.

CLEANS UP WITH SKEPTICAL APPROACH

Don't believe everything you're told. It may pay off.

Miss Jean Levitch of San Antonio Air Materiel Area developed just that kind of healthy skepticism about the contractor's prescribed replacement rates for the micron filter of the ultrasonic air cleaner. The result was a $245,616 saving for the Air Force.

The ultrasonic air cleaner cleans fine-mesh filters used in all firstline aircraft and hydraulic servicing carts. The micron filter removes contamination from the solvent used in the ultrasonic cleaner.

The manufacturer of the cleaner specified a 20-hour replacement rate. An investigation by San Antonio Air Materiel Area engineers, instituted by Miss Levitch, showed that the micron filter would stand up for 100 operating hours. As a result, the provisioning quantity for the filter was reduced 20 percent—from 6,396 per year to 1,279. The price of a filter is $48. Savings totaled $245,616. ☐

LAB FRAMES WEIGHTY DECISION

A study to ease the load of the soldier in the field not only did just that but also cut the cost of the load-bearing apparatus.

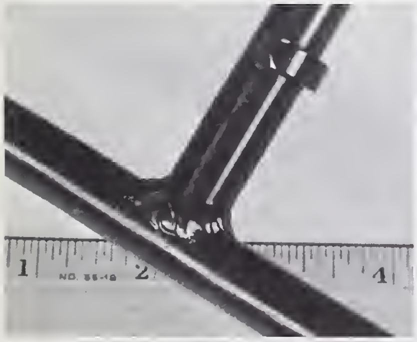
Extensive field experience had demonstrated that the frame which supports the soldier's rucksack became misshapen and distorted after use by airborne troops in jumps. Another complaint was that the web straps shifted out of place along the tubing.

Value engineers raised the outside diameter of the aluminum tubing from nine-sixteenths to five-eights of an inch, changed the fabrication technique from hand-welding to a relatively inexpensive riveting operation, and added retainer clips to prevent the straps from moving out of position. The riveted frame proved twice as strong as the welded frame, strap slippage ended, and costs dropped 18%.

The price of the welded frame was $8.72; the riveted frame, $7.19. Savings totaling $93,864 were realized in FY 1966 on a quantity of 61,349 frames.

Leading proponent of the redesign was Leonard I. Levine of the U.S. Army Natick Laboratories, Massachusetts.

BEFORE



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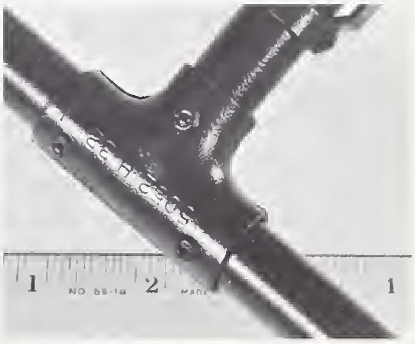


UNLOCKS SAVINGS

A $1\frac{1}{2}$-inch padlock will secure files as well as the more costly $1\frac{3}{4}$-inch size. This revelation occurred when Anthony Bianchi (at right in photo) and Lieutenant Colonel A. J. Cruz, USA, of DSA's Defense Industrial Supply Center found that both locks contained identical mechanisms. Elimination of buy requirements for the $1\frac{3}{4}$-inch size saved $23,560 on pending procurements. Joseph Wexler, Value Engineering Administrator at the Center, is shown holding both locks. ☐

HELIUM SUPPLY SYSTEM

The cost of helium in the pursuit of experimental research has been drastically reduced at Aerospace Research Laboratories, Office of Aerospace Research. Sizeable consumptions by three laboratories were previously satisfied independently with regular 1.5-cubic foot gas bottles.

A closed cycle supply system was designed and installed with surplus equipment (helium compressors, high pressure storage vessels, etc.) from closed-down BOMARC and ATLAS sites. The more efficient design of the new system now satisfies simultaneously the requirements of several laboratories. The bulk helium supplied through the new system resulted in a $9,707 savings. ☐

CABLE NOT UNIQUE, BUYER FINDS

A supply catalog reference that names only one supply source for an item should be taken with a grain of salt—according to Joseph Pavluk of DSA's Defense Industry Supply Center in Philadelphia.

Faced with a buy order for cable specified by Federal supply number and listed as proprietary in the Defense Supply Catalog, Pavluk screened additional listings until he found several that would fill the bill equally well.

The Army was able to select one of the substitutes costing $0.119 per foot compared with the $0.263 per foot for the proprietary cable. The Air Force found a usable substitute at $0.008 per foot.

Initial savings amounted to $25,550. Further, the proprietary item has now been eliminated from the Defense Supply Catalog. ☐

PROPELLER MECHANIC DESIGNS REPAIR KIT

What's it like to give Uncle Sam $20,000 a year? Frank J. Shivick knows. He designed and built a jig and peening tool kit that enables Military Airlift Command maintenance men to repair C–133 propeller contactors. The device cut maintenance costs $20,000 in 1965 and bigger savings are forecast this year.

Shivick is a propeller mechanic wth the 436th Military Airlift Wing, Dover Air Force Base, Delaware.

Contactors which control the flow of electrical power to the automatic propeller pitch control mechanism were thrown away when they became defective. New contactors, costing $301 each, were installed.

Using Shivick's jig and peening tool kit and locally stocked parts, Dover maintenance men repair contactors at a cost of $142.05 each.

Shivick has been awarded $950 through the Air Force civilian suggestion program.

HEADS-UP HELMET RECONDITIONING

Protective helmets for flying crew members formerly were discarded when their plastic shells became excessively chipped and scratched. Now a damaged helmet is reconditioned by stripping it of inner and outer components, sanding, and then applying epoxy paint to the shell and reassembling the unit with new parts. Annual savings will run $12,000, according to Captain Jay P. Gatlin, cost reduction program monitor for the Chief of Supply, Tyndall Air Force Base.

The photo shows Sgt. Raymond A. Penman inspecting a reconditioned helmet before reissue.

THE MANAGEMENT OF MILITARY REAL PROPERTY

By EDWARD J. SHERIDAN
Deputy Assistant Secretary of Defense
(Properties and Installations)
Office of the Assistant Secretary of Defense
(Installations and Logistics)

Communities Affected

In the spring of 1962 there was a growing awareness among the population of Mobile, Alabama, that perhaps one of their principal sources of employment, which had appeared to be a permanent part of the community and had afforded their lives a measure of security, was vulnerable. There were disturbing signs that Brookley Air Force Base, just on the edge of town, with its $15 million annual payroll, might be diminishing in military importance. The gradual reductions in personnel and changing missions were reflected in letters from the local employees to Washington. The signs were well-summarized in one letter to the President in September 1963, which read, in part: "Brookley Field, where I have worked many years, with all its potential, is dying because of diminished workload."

But, on the other hand, the military had spent over $35 million for facilities at Brookley since 1943! How could an operation of this magnitude, with 16,000 employees, be scheduled for closure? The answer is that it could be and was. On November 19, 1964, the Secretary of Defense announced 95 separate actions to consolidate, reduce, or discontinue Department of Defense activities in the United States and overseas. Among the 95 actions was the announcement that, "all functions of the Mobile Air Materiel Area (Brookley AFB) will be phased out and transferred to other Air Force logistical bases by July 1969." After that date the missions performed at Brookley will have been absorbed elsewhere in the broad Air Force logistical system, its people will have accepted employment elsewhere, and the facilities which have played a vital part in the Air Force logistical system throughout the years following World War II will be released for some other constructive use.

Efficient Utilization Is Objective

This story, and others like it, have been repeated many times since 1961 when President Kennedy directed the Secretary of Defense to evaluate all military installations to determine their need in relation to our defense posture. President Kennedy, early in 1961, specifically instructed Secretary McNamara, first, to develop the force structure necessary to meet our military requirements without regard to arbitrary budget ceilings and second, to procure and operate this force at the lowest possible cost.

The policies on Defense logistics management, begun under President Kennedy's direction, have been vigorously continued.

The total Department of Defense cost reduction program at the beginning of this year had achieved savings of $4.8 billion per year over the cost of operations which existed in 1961. The objective is to increase the rate of annual savings to $6.1 billion by July 1968. By comparison, the $6.1 billion annual savings goal for fiscal year 1969, if realized, will exceed the combined military construction program cost for the fiscal years 1963, 1964, and 1965 by $1 billion.

Approximately one-fourth of this goal is the responsibility of Properties and Installations, under the Assistant Secretary of Defense (Installations and Logistics). The major portion of the savings within Properties and Installations will be accomplished by an intensive effort to improve the real property management techniques to insure that obsolete and unnecessary properties are eliminated from the holdings of the Department and that those properties which are retained will be managed in the most efficient and economical manner.

Billions Invested

It is conceded that $6.1 billion is a colossal figure and that the $1.5 billion portion—which will be Properties and Installations' share—will take extra effort. To parody a current catch-phrase, "We must do something right" to reach the goal. But look at what we have to work with. The Department of Defense has custody and control of over 1,100 major and 12,000 minor installations located on 31 million acres of land (more than the combined acreage of the States of New Jersey, Delaware, Maryland and West Virginia) which, with the land improvements, cost about $38 billion. There are 3½ million personnel (military and civilian) working worldwide in the Defense Establishment, about the same as the population of San Francisco. Annual personnel costs alone can be conservatively estimated at $17.5 billion.

Look at the record to date! Since 1961 the base closure program has:

1. Taken action on—862 base closures and reductions.
2. Released—1,740,000 acres of land.
3. Released—66 industrial plants for commercial use.
4. Eliminated—200,000 personnel positions.
5. Realized savings of—$1.4 billion annually.

Readiness Accented

Much has been said about the effect of the base closure program upon the Nation's defense posture. It has been said that we should hold on to all of our bases or that large personnel reductions from base closures will injure our economy. Base closures and reduction actions are not taken if such action would weaken our defenses. On the contrary, because of changes in military technology, shifts in weapons requirements and changes in the international situation, we can, through prompt adjustments in our base structure, actually strengthen our defense. Elimination of those installations which have outlived their usefulness, or are in poor condition and require excessive costs to maintain, materially strengthens the military base structure and increases our combat effectiveness. Funds which would otherwise be wasted and thus be a drain on the Nation's resources are available for the purchase of additional military hardware or to satisfy other requirements. As for the large personnel reductions resulting from base closure actions, each career employee whose job is terminated is offered another job opportunity. If the new job requires a move to another location in the Department of Defense, the moving expenses are paid by the Government. The Department of Defense program of personnel adjustment ensures placement in a wide variety of new jobs. The services of the Department of Defense and the Office of Economic Adjustment, are made available to communities affected.

Impacts Cushioned

We have found that when communities and State and local governments work with us and with other departments of the Federal Government, the results can be remarkable. For example:

In Presque Isle, Maine, there were 1,200 military and 275 civilian jobs at the Air Force base before it was closed in 1961. Now there are more than 2,000 civilian jobs in their place.

In York, Pennsylvania, when we sold the Naval Ordnance Plant, 95 percent of the civilian personnel elected to remain with the corporation which purchased it and since the sale, civilian employment has increased by 60 percent.

In Ogden, Utah, the former Naval Supply Depot was declared excess, and 636 acres and 149 buildings were sold to private industry for $6,302,103. As a result, the Navy saves $4,897,000 per year, new jobs are created, and the facility is back in productive use in the civilian sector of our economy.

Many Functional Areas Involved

In addition to the base closures and reductions, which account for the major portion of the cost reduction program under Properties and Installations, the area of improving real property management has been most effective in producing dollar savings. In improving real property the broad types of management actions that have resulted in cost reduction for real property maintenance have been in the area of consolidation of functions, improved methods and techniques, lower rates in procurement of utilities, elimination of unnecessary services and the better programing of manpower.

In most cases, the cost reduction is achieved at the lowest working level. The interest of all personnel responsible for the real property maintenance and operation in effecting cost reduction is outstanding.

Evidencing this, is the fact that the established goal of $45 million for Fiscal Year 1965 was exceeded by more than 50 percent.

Examples of the type of savings being achieved within the cost reduction program for improving real property management are:

1. Consolidation of the Public Works functions at the Naval Station, Concord, California, with those at Mare Island Naval Shipyard produced a savings of $170,000.

2. At Letterkenny Army depot, evaluation of the contract for custodial services reduced the frequency of waxing and buffing resulting in an annual savings in the contract for 1965 of $51,885.

During Fiscal Year 1965, the Strategic Air Command introduced additional P–2 firefighting vehicles into their firefighting system, resulting in manpower savings of $1,279,800.

Efficiency Techniques Vary

The Properties and Installations organization, under the direction of the Assistant Secretary of Defense (Installations and Logistics), is concerned with all matters relating to the acquisition, construction, maintenance, operation, and disposal of military real property. The Directorate for Construction, and the Directorate for Real Property Management carry out the policies of the Secretary of Defense and furnish guidance in their respective fields to each of the Military Services. The cooperation received from the Military Services and other Defense organizations is an important element in preparing any plan for better property management. The cost reduction techniques used in the past by the Properties and Installations organization have included onsite, comprehensive surveys of all military activities within a geographical area by a joint Army-Navy-Air Force-OSD survey team; studies concerning single installations; examination of weapons systems changes to determine whether the supporting installation can be made available for other uses; consolidation of similar activities; and relocation of activities from "soft" installations to other underutilized installations, thus permitting closure of the excess facilities.

As expressed by President Johnson, "We expect to receive a dollar of value for every dollar we spend on defense. To do so has meant we must eliminate surplus, obsolete, unnecessary Defense installations. This has and will continue to be done."

Until this objective is a reality, the cost reduction program will remain an essential part of the management processes of the Department of Defense. ☐

SYSTEMS ANALYSIS—(Continued from page 8)

sumptions, and a responsible decisionmaker may not choose to accept the assumptions that his analysts have made. What is important is that the analyses be given a fair hearing and be acted upon if they successfully stand up under reasonable debate and criticism; or, if they are not acted upon, that the analysts are told why so that they can correct their work in the future. The analysts must have this "feedback" from the decisionmakers if they are to know which issues are considered relevant or significant, which objectives the decisionmakers wish to pursue, and which assumptions appear to them to be plausible. A systems analysis capability installed as "window dressing" is not likely to develop into a good one.

The second necessary condition is that the systems analysis operation be fed with ideas growing out of a broadly based inter-disciplinary research program. A research program is necessary in order to develop analytical tools, to define criteria and objectives for programs, and to invent new alternatives for achieving the objectives. Certainly, in Defense, the research program must be inter-disciplinary, because the scope and complexity of Defense problems are too great to be encompassed with any single discipline. I am sure that this would also be true of systems analysis applied to major social problems outside of Defense.

One practical implication of this is that, generally speaking, research funds in these fields are likely to be better spent supporting research institutes containing groups of scholars from a variety of relevant disciplines oriented toward the problems, rather than on individual scholars who are more likely to be oriented toward the exercise of their academic specialties.

Conclusion

Ultimately, policy decisions will be based on judgments about relative values, the likelihood of uncertain future events, which risks we should and should not run, et cetera. Good analysis can do a great deal to sharpen the issues, clarify the alternatives available to the decisionmakers, and narrow substantially the range of uncertainty, thus freeing the responsible officials to concentrate their attention on the crucial judgments. ☐

MEDAL FOR PROGRAM LEADERSHIP

Deputy Assistant Secretary of Defense, Robert C. Moot, is shown admiring the medal he has just pinned on Colonel Alston

The Joint Service Commendation Medal has been awarded to Colonel Jack C. Alston, USAF, for meritorious service as Department of Defense Director for Cost Reduction Policy from September 1964 to May 1966.

The award was presented to Colonel Alston by Deputy Assistant Secretary Robert C. Moot, May 19, at a Ceremony in Alexandria, Virginia, honoring Colonel Alston on the occasion of his reassignment to Hill Air Force Base, Utah, as Base Commander.

Mr. Moot praised Colonel Alston for his "outstanding coordinating ability in guiding the continuing development and improvement of the defense cost reduction program."

Colonel Alston was with the Mediterranean Allied Air Forces during World War II and, immediately after the War, served as Chief of Staff of the European Air Transport Service in Weisbaden, Germany. Subsequent assignments included duty as: Deputy Commander, USAF Central Coordinating Staff in Ottawa, Canada; Chief of Staff, Ballistics Systems Division, Air Force Systems Command at Norton Air Force Base, California; and Commander, Western Contract Management Region, Los Angeles, California.

Colonel Alston is a graduate of the Flying School at Kelly Field, Texas; University of Utah; USAF Command and Staff School; and the Army War College at Carlisle, Pennsylvania. ☐

TOP COST REDUCTION APPOINTMENT

Harrell B. Altizer has succeeded Colonel Jack C. Alston as Director for Cost Reduction Policy in the Office of the Assistant Secretary of Defense for Installations and Logistics.

Mr. Altizer had been serving as Deputy Director of that office since October 1965. (The Spring 1966 issue of the Journal reported Mr. Altizer's receipt of the Secretary of Defense Meritorious Civilian Service Medal for his management contributions to the Defense Cost Reduction Program.)

The OSD Directorate for Cost Reduction Policy was established in October 1965. Its predecessor organization was the Cost Reduction Coordination Office. Brigadier General Joseph DeLuca, USAF, presently the Air Force Logistics Command's Deputy Director of Supply, was the first OSD Coordinator for Cost Reduction Policy. He was succeeded by Colonel Jack Alston (see story this page). ☐

NCS LEAGUE HONORS COST REDUCER

Paul H. Riley, Deputy Assistant Secretary of Defense for Materiel Requirements (Installations and Logistics) has received a 1966 National Civil Service League award as one of the 10 outstanding civilians in the Federal Government. The award was presented on April 29 at the League's Annual Career Service Awards dinner at the Sheraton-Park Hotel, Washington, D.C.

The citation for the award referred to "his management of the highly successful DoD cost reduction program which has been nationally recognized and is being emulated by all other government agencies. . . ."

The National Civil Service League is a nonpartisan, nonprofit citizens' organization founded in 1881 to promote efficiency in Government. Its career service awards program is sponsored by business firms, organizations, and individuals interested in quality in public service.

SHIPPING TO SOUTHEAST ASIA

By **GENERAL FRANK S. BESSON, JR.**
Commanding General
U.S. Army Materiel Command

Early Planning

Some years ago—in the early 1950's, with the lessons of Korea fresh in our mind—the Army undertook a concerted effort to improve our shipping services and techniques. We decided that there are certain important factors which govern an approach to that improvement.

In the first place we determined that if we were to make significant improvements, we had to analyze overseas movements as a system. Thus, we said, each element of the system must be analyzed in context as a part of the whole if we are to effect substantial advances.

The second factor which should govern an approach to improvement in oversea shipping was our recognition of the fact that it is not ships, or trains, or trucks, or airplanes or terminals that are important—it is cargo. Analysis of the system begins with the cargo. We started out with the realization that—at that time—24 percent of military dry cargo is on wheels—that an additional 42 percent will fit into a 7′ cube with a gross weight not to exceed 5 long tons. (Each of these percentages is somewhat higher today.) We had to and still do take that cargo from depots—in the United States on trucks or rail to the terminal and into the ship—reversing the process on the far shore, out of the ships onto a truck or rail and thence to a depot. The problem was to apply modern technology to establish a superior and efficient system.

Our third step governing an approach to improvement of oversea shipping was to abandon the concept that we were limited to conventional practices and ships. Modern maritime service, we noted, was a compromise dictated by tradition, by competition from other modes of transport, by existing facilities, by outmoded techniques and by established commercial patterns of traffic.

Standardizing Cargo

Now then, what were our prospects for significant improvement in ocean shipping? The Army's basic approach to an improvement in waterfront operations was an endeavor to apply mass production techniques—techniques which have established the United States as the acknowledged leader of the industrial world. The fundamental of mass production is the assembly line—a series of standardized operations at a series of positions.

At waterfront terminals, mass production techniques were violated in two important respects. In the first place, military cargo is heterogeneous—from beans to tanks. There had been no real effort to break military cargo into standard units which could be handled by standard operations. In the second place, mass production fundamentals were violated because land transport and sea transport were considered separately and not merely as a series of positions in an integrated assembly line. It is pertinent to note that the first step, both in improving waterfront operations as such and in moving toward an integration of the various modes of transportation, was to break the heterogeneous mass of military cargo into a minimum number of standard units. Specific systems covering both land and water transportation could then be developed for each type of cargo unit—a significant departure from the existing operations where all cargo was handled in the same general way.

Accordingly, we reflected rather seriously on that 24 percent of military cargo that is on wheels. We were putting this cargo in a ship just like any other piece of cargo. We laboriously picked it up and lowered it down through a little hole in the top of the ship—just like the Phoenicians a thousand years before Christ. We completely ignored the wheel—on which mankind has spent about a million years to bring about its present state of development. The answer, of course, was "exploit the wheel." We had to find a way to roll wheeled and tracked vehicles in and out of ships just as you roll your auto on or off a ferry.

Containerization

Next we took a hard look at the 42 percent of military cargo that would fit into a 7′ cube. We called this phase of our studies "containerization" to distinguish it from "roll-on/roll-off" which was our trade name for efforts to exploit the wheel.

Under the containerization concept, standard sized units moved through the transportation system from depot in the United States, to depot overseas. The primary purpose for the standard unit was to achieve great speed and economy in handling. There were, however, many attendant benefits, such as reduction and simplification of documentation, reduction in loss, damage and pilferage, and elimination of expensive export packing. These savings were applied against the cost of amortizing and reshipping the containers. These containers, as I am sure you know, came to be called CONEX—for container express.

With this background, let me move from the past to the present, and discuss the application of these principles to the hard realities of Vietnam, where port congestion is a problem.

To begin with, the CONEX container has proved itself in Vietnam, not only as a valuable aid in reducing handling and loading time, but also as a means of safeguarding the supplies from pilferage and protecting the contents from hazards both man-made and natural.

The CONEX container is a familiar sight in Vietnam today. We CONEX everything we can that is going to that battle area, sorting at the ports, and what does not fit into CONEX is consolidated as best we can in the port area.

We have dropped accountability for CONEX's shipped to Vietnam because we know we will not get most of them back. They are being used as post exchanges, aid stations, command posts, and what have you. Literally, they are worth their weight in gold.

We have initiated a new system of binned warehousing of spare parts in CONEX's to support various aircraft. Instead of shipping single line items from the depots, a CONEX is prepared with bins and a locator card, then color-coded and stenciled with the silhouette of the particular aircraft involved. When it arrives in the theater, they have a miniature depot or warehouse, all set up and ready for use in maintaining that particular aircraft.

CONEX Flexibility

There is really no end to what can be done with CONEX's; as an example, we are trying to get the warehouses that I have mentioned tied into a system whereby we could put them on trailers. Trailers are relatively inexpensive—something on the order of $5,000. That is a rather small price compared with the ability of moving these warehouses around in the theater, and knowing where they are, and moving them where they are needed.

I might add that a single, typical CONEX warehouse for the HUEY aircraft has about $25,000 worth of spare parts in it—that gives you some idea of the dollar value of what we are shipping, but is nothing compared with what we could lose if we did the job poorly.

We need more CONEX containers, and several thousand are on order. We have had to embargo the use of them to some areas because we don't have enough. Their cost is remarkably low when compared with their utility in wartime. In using them, we need to do more on simplified identification and warehousing in the States before the supplies reach the theater.

During my recent visit to Vietnam, the value and combat essential applications of CONEX's were obvious. In my considered judgment, CONEX containers represent the single most important and impressive factor in transportation, warehousing, and troop supply storage in that country today. From all this, it would appear that I am sold on CONEX. I am, and so is every commander I talked to in Vietnam.

Moving the Cargo

The best packaging and materials handling systems are of little value, however, if the system for moving the cargo or supplies is not fully effective. Part of our supply problem in Vietnam is that of getting the needed materials and equipment from the States and into the hand of the soldier or marine. The problem, as I have indicated, involves the lack of adequate harbors and interior roads. The extensive use of helicopters is solving part of the road problem and we have been working in a couple of areas on the harbor problem.

In addition to the building of a new harbor at Cam Ranh Bay, which eventually will be one of the best in Asia, we have been fortunate in having some LARC's—our 5-ton cargo amphibian—used in ship to shore discharge of cargo, and a portable dock, known as the DeLong Pier. And once we have the supplies on the beach, the rough terrain forklift has proved itself invaluable in loading supplies for interior movement.

The DeLong Pier is designed to carry a load of 500 pounds per square foot, and all equipment necessary for construction is loaded on this portable dock, which is 83 feet wide and 375 feet long. Pulled by an ocean-going tug from the United States, the first, of what I hope will be several, of these docks was installed recently in Vietnam, a short time after its arrival.

RO/RO System

Another solution to the port congestion in Vietnam is our Roll-On/Roll-Off transportation concept. We devised the RO/RO system, as I previously indicated for use during wartime for the purpose of providing direct delivery of heavy equipment and rolling stock in sizeable quantity to the troops in combat areas. However, during peacetime it has been used for the very good purpose of providing scheduled and controlled depot-to-depot direct delivery of wheeled and tracked vehicles, POV's (privately owned vehicles) and cargo carrying semitrailers between the United States and Europe.

During wartime, RO/RO provides for the direct delivery of combat support items, and fast and flexible response to theater logistics requirements. It reduces exposure of ship and cargo to enemy action, reduces oversea supply point requirements, and reduces ship loading/discharge time. RO/RO eliminates the requirements for permanent port facilities and requirements for vulnerable rail facilities.

The USNS *Comet*, a 499′ four-hold, self-sustaining roll-on/roll-off, lift-on/lift-off type ship, carrying 127 cargo semitrailers plus military vehicles, POV's and general cargo, has been carrying the burden in Vietnam. I expect to see an increasing utilization of the RO/RO concept, as we strive to keep pace with the supply demands of our combat operations in Vietnam. However, DeLong Piers, LARC–V's, Roll-On/Roll-Off ships, and rough terrain forklifts do not appear overnight. Someone with foresight has to foresee the emergency and begin thinking about the possible problems and how to solve them.

Need for Innovation

But I do not want to leave the impression that roll-on/roll-off and CONEX's are the answer to all of our problems in transportation, packaging, and materials handling. What I am stressing is that the standards and practices of the past will not—and have not—proved adequate in many instances to the challenges of today and to the challenges which we will face tomorrow. We need to shake up our complacency a little. Dissatisfaction sows the seeds of progress, and reliance on a self-satisfied attitude of "we did it once and we can do it again with the same old tools" might well be asking for disaster in the next emergency.

Continuous research and evaluation of new materials and methods is necessary to develop new package designs and methods for the protection of materiel under all conceivable transportation and storage environments.

The problem of providing this protection cannot be easily solved. Even a cursory review of the changes taking place in our tactical and logistical concepts will reveal that equipment is becoming more complex and more expensive. Global delivery and storage conditions often impose harsh treatment on military supplies, making it necessary to provide protection over extreme environmental ranges as well as protection under shock and vibration loading.

Along with the development of new equipment and supplies, will come the development of more exotic fuels, food, and equipment for the Sealab and inner space programs. This will require the development of new methods of packaging, handling, and transportation.

The Challenge

Some of our containers of today are almost as important as the item packed in them. Like the maintenance engineer, the packaging design engineer should be in on all stages of development of an important military item if we are to have all of the war and peacetime economies and efficiency we need. Modern mobility demands unit loads and containers specifically designed for the environments of many types of military operations.

(Continued on page 39)

Systems Approach

The following statement is excerpted from *Technology and the American Economy, Volume 1,* February 1966, a report of the National Commission on Technology, Automation, and Economic Progress.

Paragraphs headings have been added.

Systems Approach Defined

The technological advances which may be possible in the future will come not only from machines, but from what has been called the application of new computer-using intellectual techniques (systems analysis, simulation, and operations research)—which not only gives us greater precision in specifying the relevant variables of a problem, but also enables us to recast our way of looking at them. Much of this, as it applies to social and economic actions, has been called the systems approach.

Application to Social Problems

The systems approach has been applied previously in the development of military projects and space systems. It appears to be applicable to social problems, since these, like large-scale space and weapons projects, are complex, require a multidisciplinary approach, and involve the organization of technological or quantitative factors.

Characteristics

The approach has two main features. First, objectives are stated clearly in performance terms rather than in particular technologies or preexisting models. Thus, we would want to define a transportation problem in overall terms of the different numbers of passengers and the different amounts of freight that have to be moved varying distances over different time periods, rather than, how do we seek to rescue a "sick" railroad, etc. In such systems analysis one seeks, then, the best "mix"—of cars, trucks, trains, airplanes—in order to find the most efficient combination. The advantage of specifying objectives in systems terms is that it forces decision makers to so delineate the factors that a rational comparison of alternative solutions is possible.

The second feature of the systems approach is its emphasis upon the interrelations within a system. The usual approach has been to divide a problem into more manageable subproblems. We divide a city's traffic problem from its housing, school location, and industry location problems. Yet clearly the change in traffic flows and densities will affect residential patterns and industry concentration. Since any one problem is so directly linked with others, it has to be viewed in its entirety. In short, what a systems approach implies is comprehensive planning so that we can trace out the effects, progressive and regressive, of any set of choices and decisions upon all other relevant decisions.

Defense Uses

The systems approach is neither radical nor new. What is new are the dimensions of the problems and the possibilities because of refinements in technique, to apply this approach to situations never before thought solvable in these terms. Over the past few years, the Department of Defense has used the systems approach most effectively. "Program-budgeting," a systems approach to the functional grouping of tasks developed by the Rand Corporation, has been applied by Secretary McNamara to the reorganization of defense forces. Tools such as operations research, cost-benefit analysis, statistical decision theory, and simulation are now part of the intellectual armory of planners. In August 1965, President Johnson ordered the Bureau of the Budget to install this new approach to resource management into all cabinet level agencies of Government. These efforts are exemplary, but it seems highly unlikely that a number of analysts combining both technical knowledge of the problem at hand and a thorough understanding of strengths and weaknesses

(Continued on page 40)

REPEATING

The Army Program: An Appraisal

The following is excerpted from a "Letter to the Editor" that responded to a newspaper editorial critical of the cost reduction program. The author of the letter is Harry D. Calenberg, a retired Army officer.

The success of Army's participation in the cost reduction program is attributable to the concerted efforts of Army soldiers and civilians at all levels of command to improve the efficiency of the Army and to insure that we get the most out of our Defense dollars.

Reported savings are not the work of a few high level "figure manipulators" but, rather, represent the validated savings from new, improved and intensified actions taken throughout the Army. These actions have been initiated by literally thousands of individuals at Army installations and activities all over the world. They are reported in cost reduction reports only after they have survived a critical review and the validation of pertinent documents and computations at the source of the savings by an impartial Army Audit Agency. Reported savings are again reviewed by Program Management and Army Audit Agency personnel at each level of command up to and including the Department of the Army. When the final report is forwarded to the Office of the Secretary of Defense, it contains the audit opinion of the Army Audit Agency, certifying to the validity of the savings and spelling out any exceptions taken to the reported figures. At DoD level, reported savings are again scrutinized and validated by DoD cost reduction personnel and auditors. Final accepted figures, therefore, represent the conservative judgment of many critical reviewers and auditors at many levels of command.

It has been my privilege to have traveled all over the world promoting the program as a member of the Army cost reduction briefing team. I have personally witnessed the sincere interest and intense efforts of literally hundreds of personnel involved with the program. I have seen commanders strongly indorse the program in meetings with their assembled staffs and in published directives to their troops. I have reviewed hundreds of cost reduction ideas which have originated in the field and have been forwarded for use in booklets published periodically by the Army to crossfeed such ideas. These experiences have convinced me of the enthusiastic support which is given to the program by personnel throughout the Army.

A good example of installation level support received is one of the ideas which was recognized by the President of the United States at the DoD Cost Reduction Awards ceremony held in July of this year. SFC John L. LaRue's suggestion that modified football helmets costing $23.38 be substituted during training for more expensive tanker helmets costing $80.95 saved Fort Knox over $123,000. This is only one of the hundreds of ideas received from the "grass roots" level which have resulted in reportable cost reductions.

It is readily conceded that many of the ideas and actions reported in the cost reduction program would have been taken regardless of whether there was such a program in existence. However, they would have gone unnoticed or perhaps have been given limited local recognition and application. This program gives the Army an opportunity to receive national recognition for the new, improved and intensified management actions it is taking to get the most for the taxpayer's dollar. Wide publicity is given to allegations of mismanagement of Defense dollars uncovered by the General Accounting Office. Is not the Army also entitled to receive favorable publicity for exemplary management improvements and individual initiative which results in savings to the Government?

Suspicion has been raised concerning the validity of the reported savings on the basis they are not all returned to the U.S. Treasury or the Defense budget has not been reduced by the amounts reported. In accordance with the terms of the DoD regulations on reprograming of funds, realized savings may be reprogramed, within the limits established, to meet unfinanced requirements. This provides an added incentive to effect savings and a means for getting more for the defense dollar. Likewise, actions which preclude the requirement for funds are reportable.

(Continued on page 37)

One hundred and sixty-one posters, selected from more than 600 displayed by Defense contractors at five regional exhibits held during March and April, were shown on the Pentagon Concourse from May 1 to May 7, 1966.

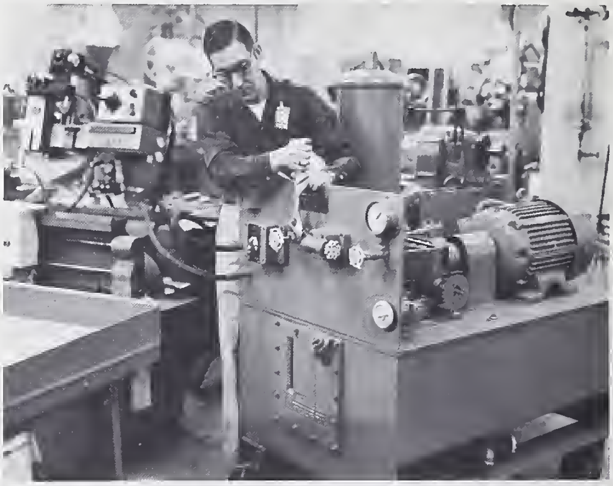
AEDC REPORTS SAVINGS

ARO, Inc., contract manager of the Arnold Engineering Development Center (AEDC) at Arnold Air Force Station, Tennessee, reports that machinist Harry Gibson (in photo) used surplus hardware to build a high-pressure coolant system for a drilling rig for a $280 labor cost, enabling the Center to cancel a requirement for a new $4,550 system.

In another cost-saving action, an inexpensive device which permits a huge gas heater to be quickly converted from burning natural gas to propane has earned a $1,000 award for Kelly M. Johnson, plant operations supervisor for the von Karman Gas Dynamics Facility.

Basically, the device suggested by Kelly is a new type air-fuel mixing valve for each of the heater's 96 gas orifices. The size orifice required for one type gas can be changed to that required for the second by merely removing a flat brass bar from a slot in each valve; reversing it and reinserting it.

Standard conversion equipment is commercially available, but it costs about $50,000. The modification proposed by Johnson cost only $2,000, including the design, fabrication and installation which was done at the von Karman Gas Dynamics Facility.



Need for the conversion has arisen several times during the past two winters when the gas-fired air heater, which can heat up to 1,500 c.f.m., to a temperature of 900° F., encountered a shortage of natural gas with which it is normally supplied. A supply of propane gas is kept on hand, but the job of converting the heater required that two wind tunnels engaged in high-priority tests be shut down for 24 hours. The conversion, before Johnson's idea was put into effect, required 100 manhours of labor. The conversion can now be made in 30 minutes by 2 men. ☐

CARBON OUT, EAM IN

An employee of Melpar, Inc., Falls Church, Virginia, observed that the distribution of a payroll authorization form (used by the Personnel Department for all payroll actions for employees) included six different locations. This six-part form used a special "block type carbon paper" to omit company confidential information from three of the copies. It occurred to her that this type of carbon paper must be expensive and she evaluated the need for the three partially completed copies.

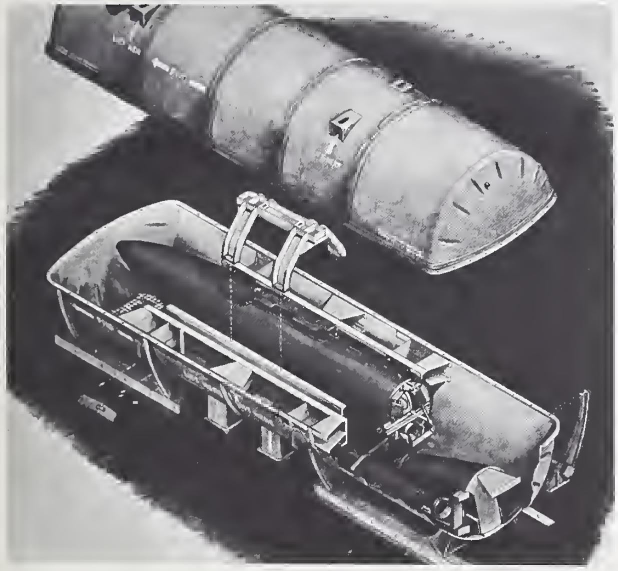
This review revealed that these copies were used by various personnel to update employee location and classification lists. Further investigation resulted in recommending that a monthly electronic accounting machine (EAM) listing, containing this information, be distributed in lieu of the partially completed copies of the form.

Projected savings amounted to $5,254 through elimination of the special carbon paper and 50 percent reduction in mailing and filing required for each form initiated. Other savings included reduction in filing space, ease of reading alphabetical list versus individual copies of a form, and less time required to correct typographical errors during completion of each form. ☐

ARSENAL NOT BOXED IN BY HIGH COST CONTAINER

Army generated a $2.5 million cost reduction for the Air Force when value engineers at Edgewood Arsenal found a way to modify surplus J–57 jet engine containers to a configuration suitable for storing and shipping USAF spray tanks.

The Arsenal had been asked by the Air Force to develop a new container for the spray tanks. Estimates based on preliminary designs indicated that the new container would cost $3,600 per unit. At this point, the Arsenal pounced on the feasibility of converting the surplus J–57 jet engine containers. The results gave the Air Force 1,084 modified containers costing $1,100 each for conversion. After subtracting costs of the feasibility and development study, net savings were $2,562,000. In addition, savings were realized from the fact that six of the modified containers can be loaded on a flat car as compared with four of the original containers.



The Army credits the savings to the joint efforts of Robert E. Lentz, Donald M. Cohen, Angelo A. Conti, Larry T. Shaff, and Robert E. Krauch—all of Edgewood Arsenal.

SURVEY TURNS UP SCOPE

Tyndall Air Force Base, Florida, spared itself the $7,700 cost of a new AN/UPA–35 radar scope when economy-minded squadron officials of the Air Defense Command's 787th Radar Squadron at Chandler Air Force Station surveyed its electronic items.

The Chandler AFS survey disclosed that a general nature scope (OA–175), useful for many different radar jobs, could meet the station's requirements as well as the specialized AN/UPA–35 scope which is specifically designed to control aircraft.

Photo shows 1st Lt. Robert K. Simmons and Alc Glenn D. Buchanan running a last test exercise on the excess scope before shipping it to Tyndall AFB. ☐

Medical personnel of the U.S. Army Advisory Group, Korea (KMAG) developed a detailed procedure for the use of a costly antibiotic—Chlortetracyclene. By exercising strict controls in the use of all antibiotics, a net saving of $57,000 will be realized during the year. This saving does not interfere with the approved treatment of patients but encourages a more selective choice of drugs. By judicious use of less costly drugs considerable savings will be made without affecting the medical capability or lowering the medical standards of the Republic of Korea Army.

NEW TESTER SPEEDS PREFLIGHT CHECKOUT

A multiple weapons ejector rack test set, built at Edwards Air Force Base (California) Flight Test Center, saves the U.S. Air Force money and man-hours. Estimated savings to date are 1,225 man-hours and $3,172 annually. The test set can be used on the F–111, F–4C, and F–105 aircraft when preflighting them prior to loading weapons on multiple racks.

In the past, the weapons ejection racks were checked with a voltmeter probe, a method that required 4½ hours for each check. The new tester—a small metal box with six indicator lights, six voltage test jacks, a male plug and some wire—is used to check each firing signal to the multiple rack. The entire preflight check can now be done more economically and more efficiently by one man in an hour. ☐

DEFENSE CONTRACT ADMINISTRATION SERVICES

By **MAJOR GENERAL WILLIAM W. VEAL, USAF**
Deputy Director for Contract Administration
Defense Supply Agency

Impetus for Cost Reduction

A new force for cutting Defense costs has been created by the consolidation of contract administration within the Defense Supply Agency. The newly organized Defense Contract Administration Services (DCAS) organization established to service Defense contracts in plants across the Nation will encourage cost reduction in all phases of the military-industry contractual relationship in an effort to get the most for the taxpayers' dollar. DCAS personnel will subject the broad spectrum of contract related activities to critical examination in an effort to reduce costs. Engineering changes in products, reshaping of manufacturing processes, more efficient control programs, more economical processes for packaging and shipping are a few of the areas where improvements have a potential for cost reduction.

Being located at or near the contractors' plants, DCAS personnel have a unique vantage point for identifying opportunity and potential for cost reduction action. When they make on-site observations or identify opportunities for possible cost reduction action, DCAS personnel can either take the action, encourage contractors to act, or recommend that buying organizations take appropriate contractual action. Thus DCAS, an organization which is itself the product of intensified management action to achieve economy, has matured sufficiently to exert its influence for further cost reductions on a broad base.

Scope and Opportunities

DCAS was established as a nationwide organization during 1965, with approximately 20,000 employees organized in 100 field offices located in principal cities and at contractors' plants. In the course of their mission, DCAS personnel have numerous functions related to industry performance in providing goods and services for Defense. Specific responsibilities include surveillance of factors and activities that affect quality of material, timeliness of delivery, control of Government property and the payment of contractor invoices.

The potential for reducing cost is apparent in statistics that reflect the scope of DCAS activity. Currently more than 200,000 prime contracts valued at more than $40 billion are in force with more than 20,000 contractors. In addition to the basic purpose of acquiring a specific item, Defense procurement contracts also provide for the expenditure of funds for other significant logistics requirements. For example, some contracts require the design and development of new items. Certain contracts require the application of value engineering analyses—not only on new items, but on older items. Virtually every contract provides for packaging and shipment of the material being acquired. In still other instances contracts provide for industry action to store, maintain, acquire or dispose of items and material to meet the needs of military departments and agencies. These are some of the vast areas that offer almost unlimited potential for cost reduction by simplification of requirements, combination, modification, even elimination—so long as basic Defense requirements are fulfilled.

Favorably Positioned

To accomplish its assigned mission, DCAS employs technical specialists knowledgeable in military logistics requirements and the operations of the industry that fulfills those requirements. In the course of accomplishing day-to-day responsibilities, DCAS specialists are in a position to observe the numerous actions and interactions that occur between the defense agencies that generate contractual requirements and the plants of industry that provide the required hardware and services. The potential for cost reduction exists largely because DCAS has a specialized technical knowledge and a unique vantage point from which to view the numerous complex operations that occur in connection with the contractual agreement between industry and the logistics systems of the Department of Defense.

Another factor which will help DCAS personnel effectively reduce costs is the precise demarcation of their arena of activity. The basic procurement actions of signing contracts with industry are performed by the military departments. From this point DCAS is designated as the Government administrator of contracts during a cycle of operations that includes production, shipment, acceptance and payment. As such, DCAS is the agent of the buyer at or near the contractors' plants. Inherent in the DCAS relationship with buying activities is a requirement to observe and report significant facts, particularly those affecting cost, to those activities. When a DCAS representative in a manufacturer's plant observes a situation which indicates that a change of some sort could reduce cost, he can be sure that at least one party to the contract, the military buyer, will be receptive to receiving the information and approving the appropriate change. Additionally, experience indicates that industry, the other contracting party, will also react favorably when a change that will reduce cost is identified. Knowledgeable industry recognizes that many efficiencies which reduce costs will, in the long run, bring about better levels of profit. Some Defense contracts have incentive clauses that directly reward industry for improvements that reduce costs. In other instances the efficiencies of cost reductions enable a company to become more competitive and thereby increase its share of future procurement for the same or similar work. Such changes might not save the Government money on current contracts but would result in lower prices on subsequent similar contracts.

Increased Industry Participation Sought

Because of the tremendous potential, DCAS will conduct a continuing drive to encourage greater industry participation in the defense contractor cost reduction program. DCAS is the catalyst in this relationship. Its role is not so much to take specific actions that reduce cost, but rather, to seek opportunities for cost reduction and report the facts to the organization directly responsible for necessary action. Notwithstanding a significant effort already made to inform industry management of the potential that exists in an effective cost reduction program, there still remains much to be done. DCAS can and will provide the motivation.

Both the President of the United States and the Secretary of Defense have publicly stated their interest and support of industry cost reduction efforts. Industry, too, has expressed interest, but there still remain a great many company officials whose wholehearted support and cooperation must be obtained. As part of its program, DCAS will utilize a combination of approaches such as personal contact in the course of day-to-day activity and idea interchange through publications and seminars of industry and trade groups. These and other actions will be directed toward broadening the base of understanding and increasing total industry participation. The extent of industry's actual participation should be clearly evident to DCAS personnel, for they process the essential documentation that can convert the ideas for cost reduction into action and beneficial savings.

Measuring Achievement

In order to encourage cost reduction action on a regular basis, a simple reporting form has been devised which can be completed during the course of normal day-to-day activity. The form is designed to make maximum use of attachments so that preparation of the report can easily be completed with a minimum of administrative effort. The form is made out by individual DCAS specialists and submitted to the Defense buying office that awarded the contract. The arrangements for reporting amount to a continuing contest that will pit field organizations with comparable levels of activity against one another. By subdividing objectives this device acts to provide management motivation and essential specialist participation throughout the nationwide organization. Significant individual contributions and actions are recognized through a DSA program established for this purpose.

One of the most outstanding elements of the DCAS cost reduction program is the firm baseline for measuring most savings. The contract which indicates a firm requirement to spend specific funds for procurement also provides a base for savings computation. Thus, in any instance that DCAS can originate or encourage a contractor to originate an action that directly reduces contract costs, a resulting savings can readily be computed.

Economy a Prime DCAS Objective

The cost reduction program is an essential part of the DCAS mission. The DCAS activity might be described in terms of the well-known movie news service whose slogan is, "The Eyes and Ears of the World." DCAS is "the eyes and ears" of Defense logistics activities, with responsibility for searching out and reporting noteworthy cost reduction actions from remote vantage points. With knowledgeable technical personnel located at the site of industry, DCAS stands as a significant new force for cost reduction within the Defense Establishment. □

TUNED TO IMPROVEMENT

These look-alikes are almost $7,000 apart in price but not one jot apart in training effectiveness. The photo at left shows the tuning panel of a power-amplifier klystron—a delicate electronic item used extensively in radar, tropospheric radio, and satellite communication systems. The companion photo shows the tuning panel of a training device which produces the same meter readings as a klystron.

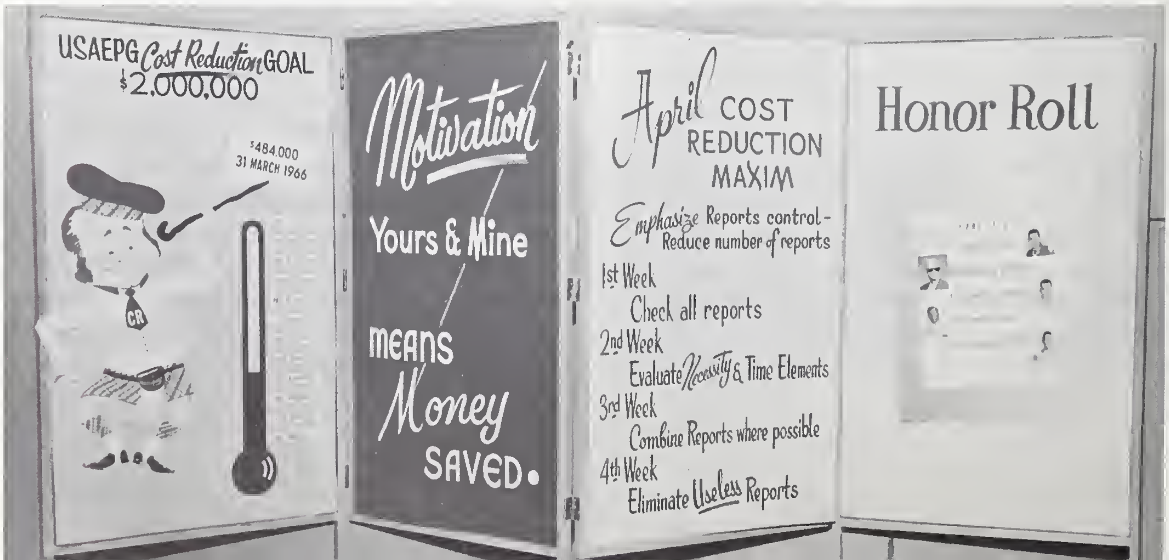
Four klystrons a year, at a cost of $8,822 each, were being consumed in training at the U.S. Army Signal Center and School, Fort Monmouth, N.J. Analysis disclosed that the high damage rate was attributable to students' tuning errors.

Signal School Education Specialist Sidney Katz suggested that beginners tuneup on simulated klystrons with real meter readings. The school's training aids division developed and produced the device, immune to student mishandling, for $4,579. Subsequently, five additional copies were procured at $1,912 each, costing $14,139 in all. These devices instill the proper skill in trainees. Toward the close of the training period, real klystrons are used—and not one has suffered damage since the new training technique was adopted.

Savings for the first year totaled $21,150 after deducting the costs of the devices. Recurring annual savings will total $35,288—the prior annual outlay for four klystrons. ☐

MAXIM OF THE MONTH

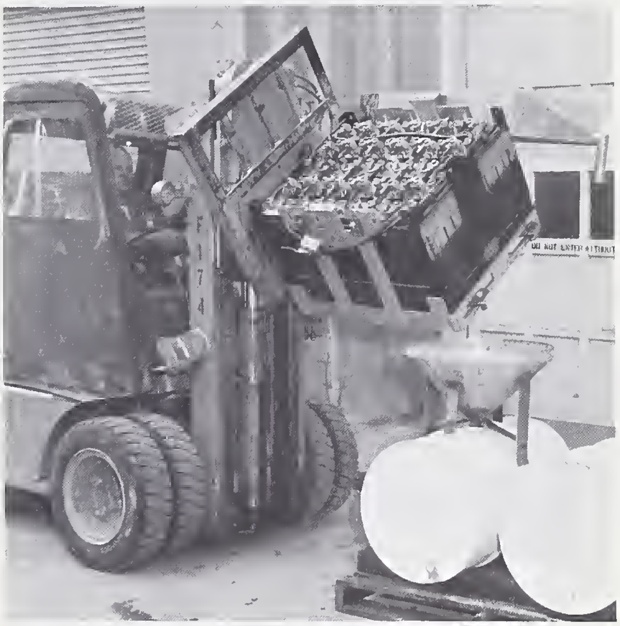
The U.S. Army Electronics Proving Ground, Ft. Huachuca, Ariz., displays a maxim-of-the-month to keep the focus on cost reduction the year round. Pictured below is April's maxim flanked by a best-ideas honor roll on one side and a thermometer recording monthly progress toward the organization's annual goal on the other side.


USAEPG Cost Reduction GOAL
$2,000,000
$484,000
31 MARCH 1966
CR
Motivation
Yours & Mine
means
Money
SAVED.
April COST REDUCTION MAXIM
Emphasize Reports control - Reduce number of reports
1st Week
Check all reports
2nd Week
Evaluate Necessity & Time Elements
3rd Week
Combine Reports where possible
4th Week
Eliminate Useless Reports
Honor Roll

BATTERY GETS LIFT

It used to take 9 hours to dump the electrolyte solution from the 30 cells in the 1,450-pound industrial alkali battery. Now, the job is nicely done in 1 hour by Rock Island maintenance personnel.

The old method (left photo) was to disassemble the battery and empty each cell individually. The new method (right photo) consists of upending the entire battery by means of a forklift truck equipped with revolving forks, as illustrated in the photo. The automated technique saves $30.90 per battery.



REPRODUCTION CONTROL

Organizations heckled by questionably official or excessive use of copying machines by "do-it-yourself" operators can take their cue from the U.S. Army Command and General Staff College where a Copytron and a Xerox have been moved from separate locations into the typing pool under the control of a single operator. Requests for extravagant amounts or for reproduction of material of a doubtful official nature are referred to the chief of the Administrative Division.

Average monthly cost of reproduction prior to the switch was $1,113. Now, the cost is $712 per month, a saving of $401—month after month after month. ☐

DOUBLE TAKE ON PRIORITIES

Can all or part of that shipment go by truck or rail?

Transportation personnel at Tracy Defense Depot toss this question at every requisitioner who assigns an air priority to his shipment. The question has evoked enough second thoughts to bring about a 10.6-percent decrease in transportation costs.

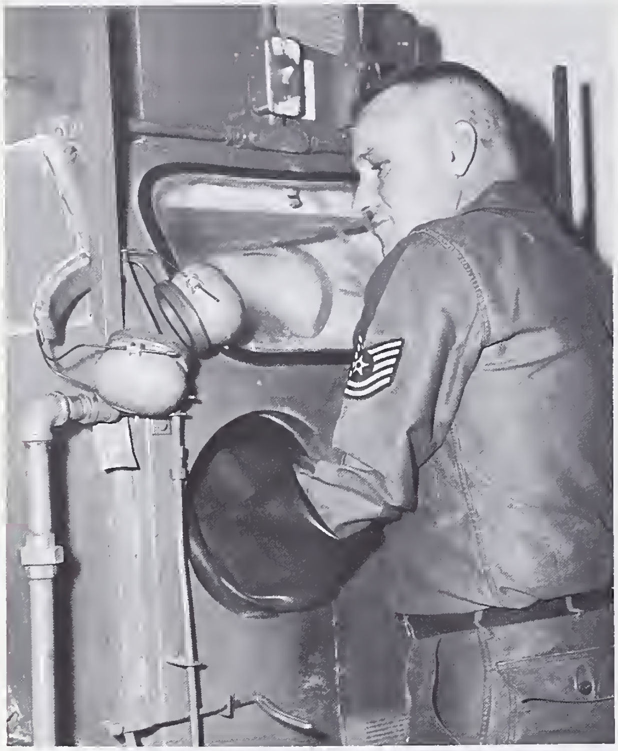
Shipments in accordance with the priorities initially indicated by requisitioners would have cost $3,400,658 in the first 6 months of fiscal year 1966 at Tracy Defense Depot. Rethinking the priority shaved $358,731 from that figure. ☐

CYCLOTETRAMETHYLENETETRANITRAMINE

That spells HMX—a mix used in propellant powder for missiles.

The ATHENA missile contract specified that HMX was to be Government furnished. If B. W. Barnett, a wide-awake contract administrator in the Ballistics Systems Division at Norton Air Force Base, had not unearthed 35,000 pounds of the stuff in the excess inventory of another missile contractor, the Air Force would have had to pony up $50,875 for a new procurement. Cost of repackaging and reclassifying the excess HMX was $3,000. Net savings to the Air Force totaled $47,875.

SANDBLASTS MAGNETO BLOCKS



Arm encased in protective rubber sleeve, T. Sgt. Warren L. Thornton grips aircraft magneto block for sandblasting in the Travis Air Force Base, Calif., magneto repair shop.

A couple of "penny pinching" ideas by a magneto repair technician at the Military Airlift Command, Travis Air Force Base, Calif., have ballooned into $19,500 validated savings.

TSgt. Warren L. Thornton, 60th Communications and Electronics Maintenance Squadron magneto repair section, figured it would be quicker and cheaper to stock and assemble magneto points than to order complete sets for use in repairing C–124 aircraft magneto blocks. He proved his theory by buying and installing parts in the shop.

The sergeant's other moneysaver called for sandblasting used magneto blocks rather than buying new ones.

Instead of paying $14 a set for assembled magneto points, points are now assembled and installed in the Travis shop at a cost of $6.97.

Magneto blocks costing $35 each are sandblasted and returned to service at an average cost of $2.44—saving more than $32 each.

The Travis magneto shop restores about 150 blocks and replaces more than 300 sets of magneto points each month. ☐

CONCRETE MEETS ITS PEER

Steel **H** piles for pier construction at Hvalfjordur, Iceland, are beng coated with coal-tar epoxy instead of the originally specified concrete, saving Navy $90,057.

Coating is necessary to protect against corrosion. The cost of concrete jackets, poured on the upper portion of the piles subsequent to driving as prescribed in the specifications, was approximately $10.40 per foot. Since concrete is subject to flexing, field repairs would have been expensive.

A value engineering study recommended substitution of shop-applied coal-tar epoxy at a cost of $2.25 per foot. The epoxy coating can be touched up or repaired in the field.

Savings of $8.15 per foot were registered on 11,050 linear feet of coated piling.

The substitution is credited to H. L. Kingsbury, a value engineer with the Atlantic Division of the Naval Facilities Engineering Command. ☐

EQUIPMENT USE

Photo shows Mr. Francis E. Vertz, supervisor of the Fort Buckner Post Engineer Equipment Pool, making an on-the-spot check of an air compressor on loan to the Army from the U.S. Marines at Camp Butler.

Through a joint agreement authorizing the interchange of construction equipment between the U.S. Army, Navy, Air Force, and Marine Corps units on Okinawa, the Fort Buckner Post Engineers have tallied savings of $10,300 in 5 months by arranging 5,562 hours of equipment use among the services. ☐

THE SERGEANT LOOKS AT COST REDUCTION

By MSGT. BILLY F. HARMON

Cost Reduction! There's not even any Air Force specialty for it. Yet, there was the assignment staring me in the face. Neatly lettered above the door was the sign, "Air Training Command Cost Reduction Office."

Before entering the door, I stopped and thought back on my recent 4-year tour in Rio de Janeiro, often called the most beautiful city in the world. How had fate picked me for this new assignment into the great "unknown" of the cost reduction program?

Once inside, I knew that for me a new stage of career management was beginning. And at this point, I didn't even know what it was about. Cost reduction had always been one of those things you see and hear but don't talk about. I was no exception.

My first assignment was to read the cost reduction manual. In this manual the entire program is explained. Knowledge gained from this reading should enable me to monitor the reporting of savings by base activities and to consolidate and send these reports on to Headquarters USAF. Sounded easy enough. Past experience as an administrative NCO had taught me to read and understand directives. Was I in for a surprise. To read the cost reduction manual and quickly understand the technicalities of identifying and reporting savings is next to impossible. At first I thought you had to be a comptroller/budget type to get an inkling of the program. But no. As I read on, it appeared a manpower management specialist would be needed. The next chapter looked like it would take a fully qualified auditor to understand the program. Each succeeding portion of the manual clearly marked out the long road of study that lay ahead. Qualified? I hadn't even started and the bases would be looking to me for help.

For the next 2 weeks I reread the manual and visited the command representatives responsible for certain portions of the program. These visits really paid off. Not only did I get many offers for coffee and cake, but I really began to learn the program. As my waistline grew, my knowledge of the cost reduction program also grew. At the same time, there was the hope that a deflation of the midline bulge would keep pace with a loss of ego. If such came true, I could slide through a knothole within a month. These discussions became a major part of my training.

Major W. H. Tobin and Mr. Francisco Giammalvo of the Command's Budget Directorate, set me straight on the many complicated aspects of the budget portion of the program. It wasn't long before Gio (short for Mr. Giammalvo) and I were conducting phone business every day or two, and he was the man with the answers. "Harmonious Harmon," as Gio called me, finally graduated. Knowledge of the budget business was in the bag.

Mr. Merl Grubbs, command manpower representative, was also new to cost reduction. You might say we grew up together in the program. Many hours were spent together those first few weeks reading and rereading our trusty manuals and then interpreting what we had read. This was the second phase of my education.

The education wasn't complete without a few serious sessions with the Command liaison auditor, Lt. Col. R. L. Cournoyer and his cohort, Mr. Tilden Back. Both took the task to heart. These familiarization sessions paid dividends. With a firm friendship established, the many battles we have regarding the validity of certain savings are fought with a feeling of mutual understanding.

Well, 6 weeks were behind me. I thought it was all going too smoothly. How right I was! The roof fell in with the first quarter's reporting cycle. Before

I knew what had hit me, a command report had to be put together and sent off to Headquarters USAF. A 35-day processing schedule was set. It seemed like a long time in which to process one little quarterly report. That dream was quickly shattered. Every day was filled to the hilt. Saturdays and Sundays made no difference. This, too, was my first close contact with our headquarters cost reduction program project officers, who were individually responsible for submitting to the monitor's office their portions of the command report. It was a pleasure working with them. Mutually, we managed to work out our problems. The manual was new; the forms were new. You might say that none of us had past experience in compiling the report. When time came to have an IBM run made on the report—required by Headquarters USAF for their processing—it appeared another insurmountable problem had been met. Another call for help went out. SSgt. Lester L. Lloyd, a data automation programing expert, answered our plea. Pitching right in and joing our team, he solved the data processing problems. "D-day" finally came. The report was ready; it was mailed. All of us hoped it wouldn't be returned. With a sigh of relief, we received word that the report had been accepted and rated as "one of the best" by Headquarters USAF.

The grapevine in the Air Training Command moves fast—much faster than I care for it to move. It wasn't long before word had gotten to the field that a new NCO was in the Command Cost Reduction Office. It was taken for granted that this new man must have years and years of cost reduction experience. The constant ringing of the phone by base monitors confirmed the suspicion. They were in for a jolt. Base monitors and their NCO assistants were asking all sorts of technical questions. Was a particular savings good? How do we prepare a particular report? I countered with questions of my own. It's a good diversion. With this kind of pressure, it didn't take long for me to realize the need to "get with the program" or "get out." I chose the former. Studying became more intense; answers to questions came more readily. Looking back, some of the answers may not have been correct. At least they were honest and based on research. The secondary benefit of the hard work came back to me in the form of broadened knowledge of cost reduction.

The telephone calls formed several new friendships. During my periodic calls from MSgt. Freeman, cost reduction NCO at Sheppard AFB, I looked forward to asking how he was and hearing his regular reply, "I was better, but I'm about to get over that." MSgt. Reed, Lowry AFB, one of the bases selected last year as having one of the six most outstanding cost reduction programs in the USAF, was a regular caller. The crossfeed of information was so intense, it would be hard to define who was guiding who. Others in the command were reaching the same levels of cooperation. It is the close friendships made in cost reduction duties that make the job a pleasure.

With the first quarter's report in the mail, my supervisor, Lt. Col. J. W. Bland, command monitor, and Maj. J. F. McPadden, his assistant, informed me that I was to be a part of the Air Training Command Cost Reduction Traveling Team. We were to visit each of the 18 bases within the command, give a briefing and assist the bases in the program. The pressure was on again. Now I would be face to face with those I had bantered with on the phone. This time there would be no question for a question. They wanted the answers. At each base, it seemed, they had different problems and asked different questions. They wanted to know how to report a saving, the evaluation of a management action, the method to be used in computing the saving, how to figure the offsetting cost that must be subtracted to arrive at a net saving, or a resolve for a disagreement between the originator of a report and the base resident auditor responsible for validating. These questions were important. Base monitors expected from the headquarter's team an understandable and acceptable answer. An answer is always provided. The ATC team couldn't and still can't, always agree with base officials on a reportable savings under the cost reduction program. In these cases, it is shown why the management action is not acceptable, or why computation of savings is incorrect, or why we agree with the auditor's nonvalidation of the reported saving. This is a distasteful but required element of operation.

The continual flow of new guidance from Headquarters USAF is also one of our problem areas. Passing this on to base activities sometimes results in confusion because of the technicalities of the changes. Headquarters is put on the spot to explain the reasons behind the changes. Just a few weeks ago, after passing some discouraging guidance to our bases limiting the possibilities for receiving credit for man-hour savings, a colonel monitoring a base program called. He thought the restriction was unfair, particularly since it was imposed during the middle of a reporting year. What could we say? We agreed with his reasoning. Yet our hands were tied. We had merely passed down the guidance from higher headquarters. Reasons acceptable to our personnel at "grass-roots" level behind the change of this sort would ease our problem. However, it is not always possible for us to know the high-level reasoning responsible for midyear changes in guidance that sometimes seem to hinder our progress. Our present solution to this dilemma is to have man-hour savings reports submitted on the premise they may be acceptable.

Conflicting interpretations of certain cost reduction program guidance is another problem. Reporting procedures are involved and complicated. So many people are involved in the reporting of cost reduction actions that this can probably be considered a normal occurrence. Making a command stand on matters of differences in interpretation is probably one of our main functions in the monitor's office.

Before a person can realize the technicalities and difficulties involved in cost reduction reporting, he must be physically working in the program. It appears that to recognize and report a cost reduction savings would be a relatively simple matter. This is not so. The manual's requirement for a "new, improved, or intensified management action" will set your head spinning just a bit. The exactness of cost reporting becomes well defined as one learns to compute savings by citing "before" and "after" costs; all of which must be proved by detailed documentation. It is not just a simple matter of jotting down a few "guesstimates" and letting it go at that. Money is the real culprit. Was it actually allocated and the savings reported as a "realized fund" saving, or had the action prevented allocation of funds and reporting of the savings as a "cost avoidance"? Next, the originator must determine the recurring benefits of the saving, and decide whether the saving will involve the financial plan and budget estimate for the next 2 years. If so, this entails preparation and submission of a budgeted saving report for the 2 future years concerned. The problem doesn't end here. When routing the report through the auditor for his evaluation, it is often necessary to discuss the report with him and provide him with additional detailed background material in order to gain auditor validation for the reported savings.

Nine months have passed in which my progression has gone from apprentice to that of a cost reduction administrator. Three quarterly submissions of the command reports to Headquarters USAF are behind me. Now I feel at home in the program. It can be a dangerous feeling for the challenge is ever new, but the feeling of usefulness and accomplishment is gratifying. Reporting procedures are now standardized and understood by most of our reporting organizations. There are now tangibles in what had been a void. Most important, there are others in the same capacity. It is this strengthening in the personnel outlook to cost reduction that holds the key to success.

In the Air Training Command there is a pride in the work of cost reduction. It is exemplified in personal relationships, though there is a degree of security in becoming known as a number. In our own circles, Major McPadden is known as the Chief; our secretary, Mrs. Ruth Knight, is Agent 99. I'm Agent 86, or better known as "Max." It is not unusual to receive a call from Major Petram, our base monitor at Amarillo AFB, asking "99" to ask the Chief if he can speak to "86." If nothing computes correctly, we blame it on "77." We don't even know him.

This, then, is Air Training Command's position of cost reduction administrator. It still has no Air Force specialty. The sign above the door reads the same but now has meaning. Faces have become people; working partners are now friends. Cost reduction is a necessary reality and owed to the U.S. public. We are here to see that it works. ☐

ROLLERS SPEED REPAIRS

The U.S. Army Area Command's Direct Support Maintenance Shop at Würzburg, Germany, cut furniture repair time 25 per cent by combining the stripping and frame repair shop, relocating them adjacent to the precutting and upholstery shops, and using roller-conveyors on workstands.

Savings aggregate $4,000 annually. ☐

REGULAR VERSUS PREMIUM

When the U.S. Army Forces Southern Command found that its year-end bill for premium grade gasoline was 10 times higher than its bill for regular gasoline, it undertook a study of manufacturers' specifications for all of the wheeled vehicles in the command. The study showed that regular gas would suffice for almost all of the vehicles. As a result, the Command changed its gas-use habits.

Premium grade gasoline costs the command \$0.087 per gallon versus \$0.066 for regular. Based on the fiscal year 1965 consumption of 1,600,000 gallons of premium grade gasoline, the Command will save approximately \$33,600 per year. ☐

RECEIVES TANKS FOR THAWING COSTS

When Alaskan ice halts sealift of 300,000 gallons of needed diesel fuel, you airlift it. Right? No—wrong!

You scour the region, find eight semiportable storage tanks not being used in the winter months, lease them for the available period, ship them to your air station, and fill them with fuel sealifted just before the freeze.

This gambit saved the Air Force \$44,465. The man who nurtured this saving—from idea to deed—was Robert Barnett, Transportation Directorate, Alaskan Air Command.

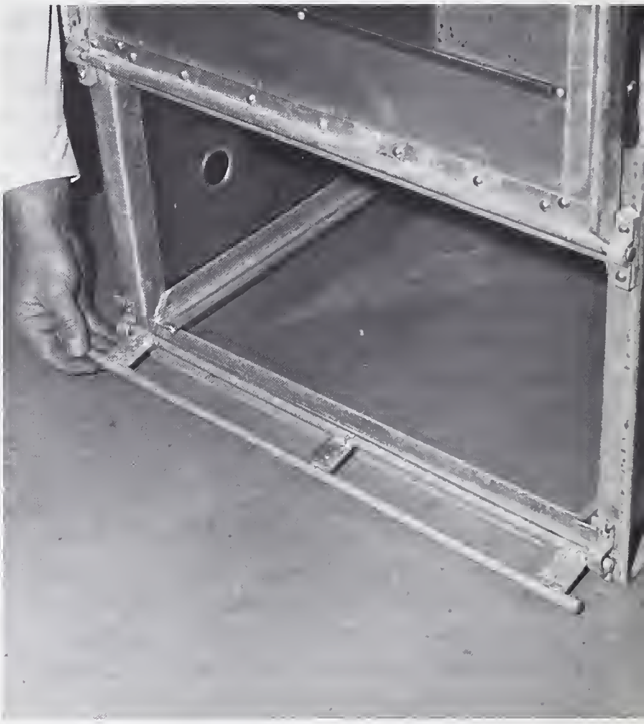
The fuel was needed at Galena Air Force Station, Alaska. Airlift would have cost 30 cents per gallon, or \$90,000 for the 300,000 gallons. The semiportable tanks, located at Nenana, were leased for \$11,088. Transportation costs for fuel and tanks totaled \$34,447. ☐

ONLY THE PRICE HAS CHANGED

The signal kit (Personnel Distress A/P 255–1) is carried by aircrew members for use as an emergency signaling device by downed crewmen. When the signal is fired, the pyrotechnic candle soars 350 feet straight up and burns bright red for at least 5 seconds.

The kit was a sole-source item costing \$4.09 before Clarence B. Keenan of Hill Air Force Base, Ogden Air Materiel Area, rebelled at the price. Keenan coordinated with engineering at Wright-Patterson Air Force Base and the U.S. Navy Ammunition Depot, Crane, Ind., to develop a competitive data package. The first competitive procurement dropped the unit price to \$2.69 for a savings of \$97,422. ☐

OPEN DOOR POLICY



This retaining bar which replaces a door on the gasoline field range cabinet saved DSA's General Supply Center \$26,208 on a procurement of 4,032 cabinets. J. M. Dunston of Army Natick Laboratories, Mass., came up with the retaining bar idea when he discovered that the only purpose of the door was to hold the fire unit in the cabinet of the field range while in transit. Substitution of the bar for the door reduced the weight 6.2 pounds, the components from 29 pieces to 5 pieces, and the cost from \$12.00 to approximately \$5.50. ☐

MANAGING MANAGEMENT SYSTEMS—(Continued from page 14)

lar the aerospace industry—also bears some responsibility in this matter. It is simply a fact, during the period of development we have been discussing, that some companies have invested large amounts in a number of fancy management systems which have had more than a shade of window dressing. Of course, the rationale here is that such an approach will help enhance a company's position with the customer, and to the extent the customer has responded in this manner, the rationale has merit.

Additions Outpace Eliminations

Is the program management requirement situation in DoD stabilized, so that everyone knows where he stands on these requirements, complex and difficult of execution as they are? Far from it. One would predict that 1966 will see greater changes in the DoD program management systems than in any prior year. There have been announcements that OSD is addressing itself to the problem, and we will return to this very important subject shortly. In addition, it has been pointed out that elimination of certain management requirements has already been achieved. Without wanting to go into the *pros* and *cons* of this, it should be emphasized that such eliminations as may have been achieved by recent OSD-level actions are minor as compared to actual new developments at the Service level, in the total program management spectrum being discussed. For example, the next version of AFSC 310–1, due shortly off the press, will have 18 new management data items in it to add to the 117 I previously mentioned—a 15 percent increase, if you will.

Incidentally, I hope no one is under the impression I am singling out the Air Force in this discussion—it is just that they do such an excellent job of keeping score in this complex area. In order not to show any prejudice, I understand we will have a new integrated maintenance management system from the Navy (based upon the very demanding WR–30 requirement), and that important revisions will take place in the Army's AMCR 11–16 Project Management series (particularly in Vol. 11, the very large document which is of greatest interest to industry). Therefore from the point of view of industry—or at least that sector of industry vitally concerned with program management system requirements—the totality of these current developments swamps anything I am aware of at the OSD level.

The DoD program management requirements problem then, is a large one—in fact, as of 1966, it could be called enormous.

The Alternatives

What can be done about it? There is one school of thought—and a pretty solid one, represented by people close to the actual implementation aspects of the problem—which says that nothing can be done about it, or, that it is too late to do anything effective about it now. This point of view is perhaps represented by a quotation from the recent Air Force/Industry Data Management Symposium, held in Los Angeles on September 28–30, 1965: "Factors mitigating against the establishment of standard authorized data lists are: the time required to coordinate a common Data Item throughout DoD (specifications often require more than one year to complete tri-Service coordination), and the fact that ADL's have not yet begun to stabilize. If the three Services and DSA were structured the same, used the same management techniques, and had the same data requirements, undoubtedly one DoD ADL could be produced even though the four organizations have different missions. Because of these nonuniformities, the probability that many of the data items can be standardized is quite low. However, the degree of success can only be determined by trial and detailed examination." (Author's emphasis.)

There is yet another point of view which questions not only whether anything can be done, but whether anything should be done about the problem. The essence of this position is that each military department should have the right to determine its own requirements for the management of acquisition programs. In some cases, this point of view is represented in even a more extreme fashion, i.e., each *project* manager should have the right to develop his own management system requirements. Taken in the extreme, such an approach

(Continued on page 38)

THE ARMY PROGRAM—(Continued from page 25)

Successful pursuance of the cost reduction program has resulted in a number of ancillary benefits to the members of the Army. Evidence of prudent management by the Services was, undoubtedly, a major consideration in approval by Congress of the recent pay raises to the men and women of the Armed Forces and to the civilian employees. Despite these raises, the Defense budget has been held down to reasonable levels, attributable in part to the cost reduction effort. Further, the stimulus of the cost reduction program has been a decisive factor in obtaining approval of the bill which provides for payment of cash awards to the military for savings suggestions. ☐

might result in approximately 150 individual program management systems in the Department of Defense—obviously not a very great likelihood, but also quite possibly something more than Secretary Anthony's 58.

Solution Possible

Needless to say, the above point of view is not shared by the author. The basic reason this view is not shared is simply that all elements of DoD must, at one time or another, require the effort and support of a common industrial base. It is also believed that the program management system problem can be addressed without damaging the fundamental management prerogatives of individual DoD organizations.

It is at this point that we can hark back to previous introductory remarks of Alfred Sloan of General Motors. Among his many other remarkable qualities, Mr. Sloan had a great genius for managing a large organization under the concept of "decentralized authority with coordinated control." Many people who are inclined to espouse decentralization of authority, and point to General Motors as the major (and hugely successful) example, are apt to forget about the "coordinated control" part. Rest assured that Messrs. Sloan and Brown in the past, and the General Motors management staff today, exercise direct interest and control over a uniform and meaningful management system for the entire corporation—a body of some 33 divisions, representing a wide diversity of businesses, although, admittedly, largely commercial in character.

Can something like this be done in the case of the Department of Defense, with regard to the necessarily more complex program management requirements laid upon industry?

As indicated previously, I believe so, but it will take some real doing. Fundamentally, the enormity and depth of the problem must be recognized and *fully* understood by the persons involved in decision-making in this area. This depth of understanding should include not only what has gone on, (and is going on) in all the military departments, but a complete understanding of internal management processes *throughout the defense industry*. Nothing less will accomplish the job. Incidentally, the necessity for this kind of capability is one of the basic reasons why the Bureau of the Budget Approval Procedure (as required by Public Law 831, BoB Circular A–40, and DoD Instruction 7700.3) has proved to be an ineffective mechanism in the complex program management requirements area.

In concluding a discussion of this kind, one is always faced with the dilemma of whether or not to make specific recommendations about the problem. As a rule the defense industry trade associations, for a number of reasons, do not typically do so. However, because of the significance of the problem and the opportunity for important cost reductions, and in the interest of a constructive approach, we make the attempt.

Steps to Improvement

Comments in this regard therefore are as follows:

1. To repeat, the Department of Defense, if there are by any chance some remaining illusions on this, should recognize the magnitude of the program management systems problem as of 1966. Specifically, it should be recognized that the "management systems" problem involved is one of greater size than the Five Year Force Structure and Financial Plan (or Program Package System), and certainly equal in magnitude to the DoD Technical Data management problem.

2. For this reason, a top DoD official should be designated with clearly stated authority for review and approval of *all* program management systems, prior to their in-house implementation or being laid upon industry. Specifically, his authority should be stated in terms comparable to that now exercised by DDR&E in connection with the review and approval of hardware programs. In other words, the suggestion is for a small-scale "DDR&E-type" function for the review and approval of *all* DoD program management systems. Incidentally, such an office should not necessarily be limited to program management systems, for there are other management system developments in DoD which have already gotten, or are rapidly getting, into similar difficulties. At the moment though, the impact on the industrial base is greatest in the area of program management systems.

3. Such an office should have the resources, including the type of personnel with the very unique skills indicated previously, to do an effective job. The key qualification for such personnel would be *actual experience* in the implementation of the complete spectrum of new program management systems, within both government and industry.

4. Once established, there are several possible approaches such an office could take. The approach preferred by the author involves three parallel efforts to be carried out as rapidly as available resources would permit:

a. Conduct a detailed examination of all current program management systems, with the view to isolating major features and differences, and the immediate purging of all obsolete or unused systems.

b. Carry out detailed reviews of all new or proposed systems, with the right of disapproval, or "remanding" for further development, any management system for which there is not a clearly demonstrated need, which has important technical deficiencies, or has not been developed in accordance with overall DoD requirements. This approach would take into account the varying requirements of systems vs. equipment programs, and would not preclude the development of new management systems on a purely experimental basis.

c. Develop a basic approach to DoD program management system requirements—probably in specification form—with the objective of bringing about the "maximum wise" amount of standardization in individual Service requirements at the earliest possible date.

Medicine Should Suit the Ailment

Perhaps the reader's reaction is that the above recommendations are pretty strong. Well, we have tried to emphasize in this discussion that we are talking about a fairly sobering problem. The Department of Defense has achieved some remarkable things in the past five years, but this particular task is one it has *not* accomplished so far. The reader may remember the story of Hercules, and the 12 tasks King Eurystheus ordered him to accomplish. One of the last and toughest ones was cleaning out the Augean stables, which had to be carried out between "the rise and set of the sun." In order to get this job done, Hercules bent the course of a couple of rivers near King Augean's property, and merged their flow into one stream. That, we think the reader will agree, was pretty strong action. ☐

SHIPPING TO SOUTHEAST ASIA—(Continued from page 23)

The Army and other Defense Departments are exerting persistent and greater pressure for more effective distribution and transportation methods to support our mammoth and complex logistics system. Military packaging, handling, and transportation must provide for the conventional and unconventional, the known, anticipated and unpredicted hazards of handling, shipping and storing supplies worldwide to sustain our allies as well as our own Forces.

An example of the Defense Department's attempt to make a significant improvement in military mobility—and more importantly—provide an "outstanding opportunity for a quantim jump in United States shipbuilding procedures" is the Fast Deployment Logistics Ship. Fast Deployment Ships are being designed to complement the airlift force of C–5A jet transports in the 1970's. Through the use of both airlift and sealift, the Defense Department feels that it will be able to move large forces by aircraft while fast, preloaded, special purpose sealift carry, without disassembly, the heavy wheeled and tracked vehicles, helicopters, and other bulky or heavy equipment. The two would come together in the crisis area. Our goal for mobility in the coming decade is an effective force fully equipped, in the crisis area within 30 days of the outbreak of hostilities.

Industry Contribution

Tremendous advances have been made in containerization, packaging, and handling being made by our friends in the civilian domain—the air, truck, and ocean lines. The airlines have announced the adoption of standard containers for the scheduled airlines, and recently requested approval from the CAB for the first phase of an industry-developed national containerization program for air freight.

In the ocean cargo area, container ships will begin service next month on the North Atlantic trade route, and containership service is being instituted to the Far East. There is increasing use of containerships throughout the industry, providing tremendous savings in cargo handling, in faster turnaround of vessels in port, and in the minimizing of cargo damage.

The big advance in intermodal transportation is also heartening. The rail and truck lines have reported gains in the "piggybacking" of truck trailers and containers on flatcars. Calendar Year 1965 showed a 15 percent gain over the previous year, passing the million-car mark in one year for the first time. I applaud all such progress—progress which will mean so much to all of us.

From such far-reaching programs, and from the never-ending industry research programs aimed at doing the job even better, the Defense Department will gain increasing benefits. ☐

> "And I am determined, as your President, to bring the administrative practices of the entire Federal Government to the same hard, lean, and alert effectiveness that we expect and have received from our Armed Forces."
>
> President Lyndon B. Johnson
> (At the Pentagon, 12 July 1966)

Item Dissected, Data Developed for Competition

Look over that sole-source item, find out what makes it tick, and then show another firm how easy it is to make.

DSA's Defense Electronics Supply Center (DESC) did just that and came up winner with a 63-percent price reduction.

The item, a variable resistor assembly which controls revolutions per minute in diesel engine generator sets used at missile sites, carried a sole-source price of $86.88. DSA analysts figured a neat profit could be turned at $60 and made exhaustive efforts to introduce competition despite lack of drawings and proprietory data claims by the sole source. Finally, when 52 requests for proposals drew only one response, the contract administration office took apart a sample unit and developed enough data from it to convince a local firm to try its hand. The result was a $38 item delivered 15 days ahead of the schedule and 30 days ahead of the schedule formerly offered by the sole source. Fiscal year 1966 savings on 527 units exceeded $28,000.

Principal contributors to the cost reduction were: David H. Deckas, contractor negotiator of DESC; Robert E. Hampton, engineering technician, also of DESC; and Ernest C. Longwell, contract price analyst with the Defense Contract Administration Services Region, Buffalo, N.Y. ☐

SYSTEMS APPROACH—(Continued from page 24)

of analytical techniques will be available for some time to come.

Extension to Non-Defense Areas

There is a strong need for the development of systems analysis capabilities in individual branches of the Government and in the Congress. Beyond this there is the broader question of how these different intellectual resources, which are being employed primarily to deal with the programs of the agencies, can be coordinated and used for the analysis of the various social problems that confront us.

One of the most useful applications of a systems approach would be in urban resource allocation and operations management, where a coordinated approach is necessary if urban life is to be viable. In the last few years, a number of such efforts, beginning with the creation of metropolitan and regional models and simulating a set of alternative changes, have begun to show the value of this approach.

Pending Legislation

In the 89th Congress, bills have been introduced into the Senate and the House which would authorize the Government to make research grants to States and universities for the application of systems analysis and systems engineering in the areas of community needs. While we cannot necessarily pass upon the specific bills themselves, we do believe that new programs may be required to bring systems analysis to bear on the problems and needs of the community. ☐

Common sense is not so common.—Voltaire

NAVY RECOGNIZES ACHIEVERS

Graeme C. Bannerman, Assistant Secretary of the Navy (I&L), signs a cost reduction certificate of merit as Vice Adm. Ignatius J. Galantin, Chief of Naval Material, looks on. One hundred and forty-nine contributors to the Navy cost reduction program received this certificated special recognition in fiscal year 1966. ☐

"Procurement of excessive quality . . . is just as wasteful as procurement of excessive quantities."

Robert S. McNamara

Bags Idea

Dirt collection bags for self-propelled sweepers that clean runways and ramps at Lajes Field, Azores, now are hand sewn by Portuguese employee, Manual Costa, at $2.25 per bag. The old practice had been to buy the bags for $7.46 each. Each sweeper has 108 bags. Savings per sweeper total $562.68. The idea for this make versus buy saving is credited to TSgt. Shelton Yow, A1c. James Wright, and A3c. Martis Cline of the Military Airlift Command's 1605th Materiel Squadron. ☐

Pennies Add to Dollars

Ben Franklin's saw about "a penny saved" never fitted better than when Navy picked up oil cooler tubes from excess Air Force stocks, thus avoiding new procurement.

An oil cooler tube contains fluid to dissipate heat from lubricating oil in aircraft reciprocating engines. Each tube costs only $0.0192, but 5 million of them (the amount of the Navy requirement that was met from Air Force excess) add up to a $96,000 saving. ☐

THE REASONS FOR SUCCESS

Just what causes a value engineering action to be successful? Generally, no single factor. However, some factors play a more influential role than others. Value engineers can take some guidance from a recently completed study of 415 selected VE actions taken in fiscal year 1965 with a value of $106 million. The three military departments, the Defense Supply Agency, and the Society of American Value Engineers collected the data for the study. The results are tallied below.

As indicated, excessive cost and advances in technology topped the list, accounting for 45 percent of the savings generated by the eight categories of stimulants for eliminating goldplating.

FACTORS LEADING TO VALUE ENGINEERING CHANGES—ANALYSIS OF 415 SELECTED ACTIONS

[In thousands of dollars]

CATEGORY	TOTAL		DOD CONTRACTORS		DOD IN-HOUSE ACTIVITIES
	415 CHANGES		116 CLASS I CHANGES	201 CLASS II CHANGES	98 VE CHANGES
Advances in technology [1]	$24,874	(23.3%)	$4,938	$1,668	$18,268
Excessive cost [2]	23,805	(22.2%)	5,736	2,967	15,102
Questioning specification [3]	18,924	(17.7%)	5,453	1,974	11,497
Additional design effort [4]	15,851	(14.8%)	1,646	7,786	6,419
Change in user's need [5]	12,644	(11.8%)	860	86	11,698
Feedback from test/use [6]	4,251	(4.0%)	832	911	2,508
Design deficiencies [7]	4,047	(3.8%)	421	123	3,503
Other	2,578	(2.4%)		2,578	
	$106,974	100%	$19,886	$18,093	$68,995

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[1] Incorporation of new materials, components, techniques or processes (advances in the state-of-the-art) not available at the time of the previous design effort.

[2] Design in use prior to VE change proved technically adequate, but, through use of a cost model or comparative costing techniques, it was determined that the cost of that design was excessive.

[3] User's specifications were examined, questioned, determined to be inappropriate, out of date, or overspecified.

[4] Application of additional skills, ideas, and information available but not utilized during previous design effort.

[5] User's modification or redefinition of mission, function, or application of item (change in user's needs).

[6] Design modification based on feedback from user tests or field experience suggesting that specified parameters governing previous design were unrealistic or exaggerated.

[7] Design in use prior to VE change proved inadequate in use (e.g., was characterized by inadequate performance, excessive failure rates, or technical deficiencies.)

RECORDS SHORTCUT IN DATA CONTROL OPERATION

Just because it's "in the book" doesn't necessarily mean it's the best or least expensive way to do something. This fact has been proved by Mrs. Clara Guerra, a data control clerk supervisor assigned to the Comptroller's Data Service Division at Air Force Logistics Command's San Antonio Air Materiel Area, Kelly AFB, Tex.

One of the responsibilities of the data control operation is the posting and controlling of input data for the stock balance and consumption reports.

This data is submitted by Air Force bases throughout the world and is used in the computation of Air Force requirements. Processed on a quarterly basis, the report also indicates what is on hand and where it is located.

Procedures required the clerks to set up 60 separate folders, 1 for each of San Antonio Air Materiel Area's prime supply classes, with 350 Air Force activities listed in each folder. This required an average of six pages per folder.

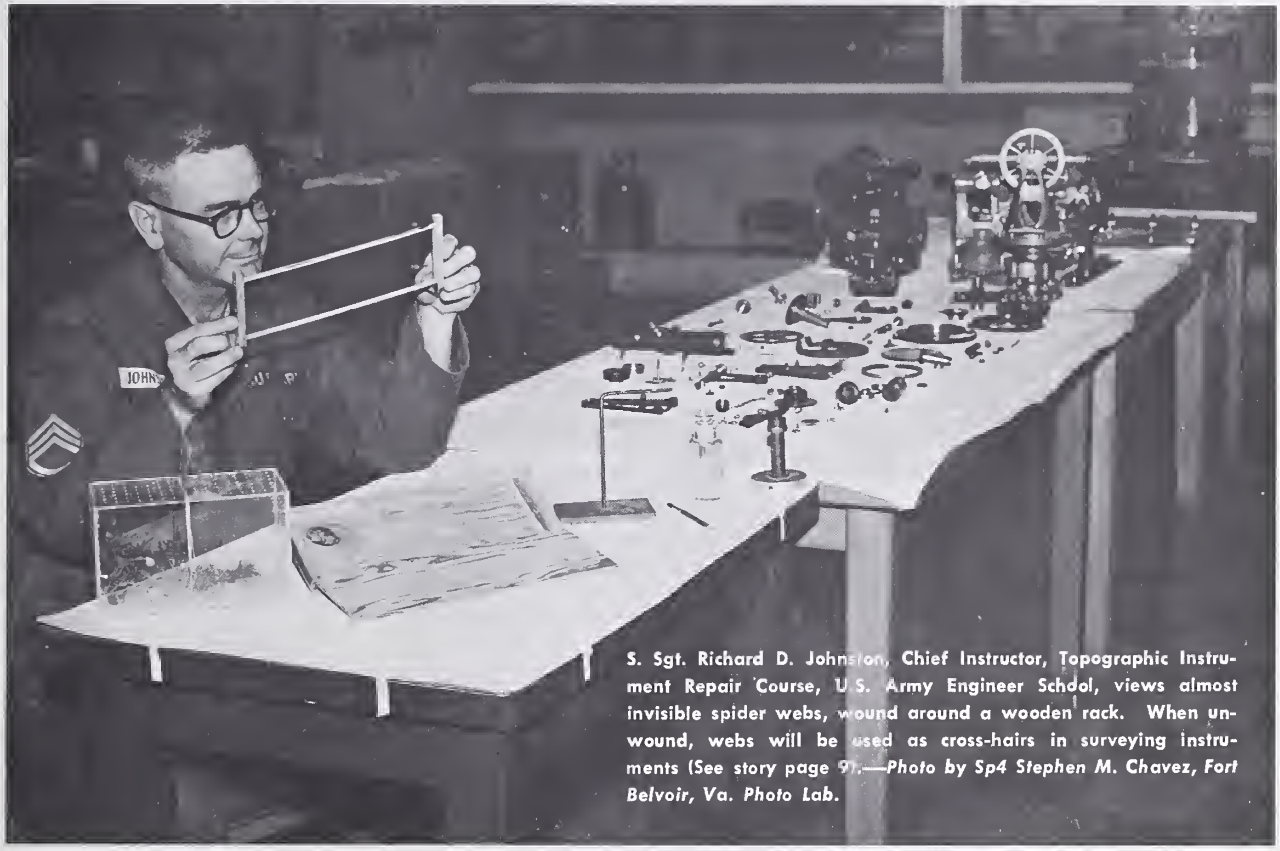
All data was handscribed. As data was received from the reporting activities, the clerk had to switch from one folder to another and scan the pages for the proper class. Short deadlines created an almost unmanageable operation.

Mrs. Guerra recommended setting up a control sheet for each reporting activity reflecting all prime classes. The control sheet would be mechanically prepared, with all classes appearing on a single page, thereby eliminating the need for skipping from one folder to another.

The prescribing directive is to be amended, permitting operation under either method. Also, permission has been granted to deviate from the current directive, pending revision.

Mrs. Guerra's suggestion has resulted in an 80-percent reduction in processing time. ☐

Mrs. Clara Guerra, right, data control clerk supervisor, and Miss Elvira Sanchez, data control clerk at the San Antonio Air Materiel Area, Kelly AFB, Tex., discuss the advantages of the new method originated by Mrs. Guerra. This method eliminates the requirement to skip from folder to folder when posting an activities input. The new procedure reduces processing time by 80 percent.



S. Sgt. Richard D. Johnston, Chief Instructor, Topographic Instrument Repair Course, U.S. Army Engineer School, views almost invisible spider webs, wound around a wooden rack. When unwound, webs will be used as cross-hairs in surveying instruments (See story page 9).—*Photo by Sp4 Stephen M. Chavez, Fort Belvoir, Va. Photo Lab.*

HIGH PRESSURE TANKS arrive by rail at the U.S. Air Force Arnold Engineering Development Center, near Tullahoma, Tenn. They are a part of more than $2 million worth of surplus equipment obtained from old Atlas missile launch facilities recently phased out at bases in Nebraska and Florida. The equipment was obtained by ARO, Inc., operating contractor for the center, at only the cost of dismantling and shipping, and represents a significant contribution to the company's cost reduction program. A large portion of the surplus equipment is being used in the modification of the center's huge J–4 high-altitude simulation rocket test cell for a series of vital tests of the third stage engine for NASA's Saturn V Apollo moon-landing-program launch vehicle.

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